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질병관리본부

코로나19 발생보고서

2020년 5월 이후 코로나바이러스감염증-19 주요 집단 발생 특징

중앙방역대책본부 환자·접촉자관리단 **김영화, 염한솔, 황인섭, 박광숙, 권재우, 김미영, 박영준, 곽진, 박옥***

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초 록

본 보고서는 2020년 5월 1일부터 7월 31일까지 최근 3개월 간, 「감염병의 예방 및 관리에 관한 법률」 제11조에 따라 의료기관 등에서 질병관리본부 질병보건통합관리시스템을 통해 코로나바이러스감염증-19(코로나19) 환자 등을 신고하고, 중앙 및 지자체 역학조사반이 역학조사한 우리나라의 코로나19 환자 주요 집단발생에 대한 보고서이다.

2020년 7월 31일 기준, 우리나라의 코로나19 전체 확진자는 14,305명, 사망자는 301명이다. 17개 모든 시도에서 확진자가 보고되었으며, 특히 대구, 서울, 경기, 경북 지역에서 많이 발생하였다. 성별로는 여자가 54.8%로 남자보다 높게 발생하였고, 가장 많이 발생한 연령대는 20대(25.3%)였다. 사망자는 60세 이상이 93.0%(280명)였으며, 남자가 53.2%로 여자보다 높았다. 치명률은 2.1%였고, 연령대로 구분하였을 때 80세 이상의 치명률이 24.9%로 가장 높았다.

최근 3개월 간 역학조사 결과 확인된 주요 집단 발생은 클럽, 종교소모임, 물류센터, 방문판매모임, 운동시설 등이며, 그 중 종교소모임, 물류센터, 방문판매모임, 운동시설에서 총 10명이 사망하였다.

주요 검색어 : 코로나바이러스감염증-19, 집단발병, 감염병감시, 역학조사, 생활 속 거리두기

들어가는 말

코로나바이러스감염증-19(코로나19)는 2020년 7월 31일까지 전 세계적으로 17,106,007명이 발생하였고, 우리나라는 2020년 1월 20일 첫 확진자 발생 이후 7월 31일까지 총 14,305명이 발생하였다. 우리나라는 지난 2월 23일부터 현재까지 코로나19 감염병 위기단계를 「심각」수준으로 유지하고 있으며, 국무총리를 본부장으로 하는 중앙재난안전대책본부를 가동하여 범정부적으로 방역에 집중하고 있다.

본 보고서는 '생활 속 거리두기'로 전환한 5월 6일 이후 집단 발생 및 산발사례 발생이 지속되고 있는 상황에서, 해외유입을 제외한 주요 집단별 발생 특성을 분석하였다. 의료기관 등에서 신고한 코로나19 발생 자료는 감염경로 확인을 위한 역학조사 결과에 따라 변동될 수 있으며, 지역별 통계는 신고기관의 주소에 기반하여 지자체에서 발표하는 코로나19 발생 현황과 상이할 수 있어 자료의 해석에 주의가 필요하다.

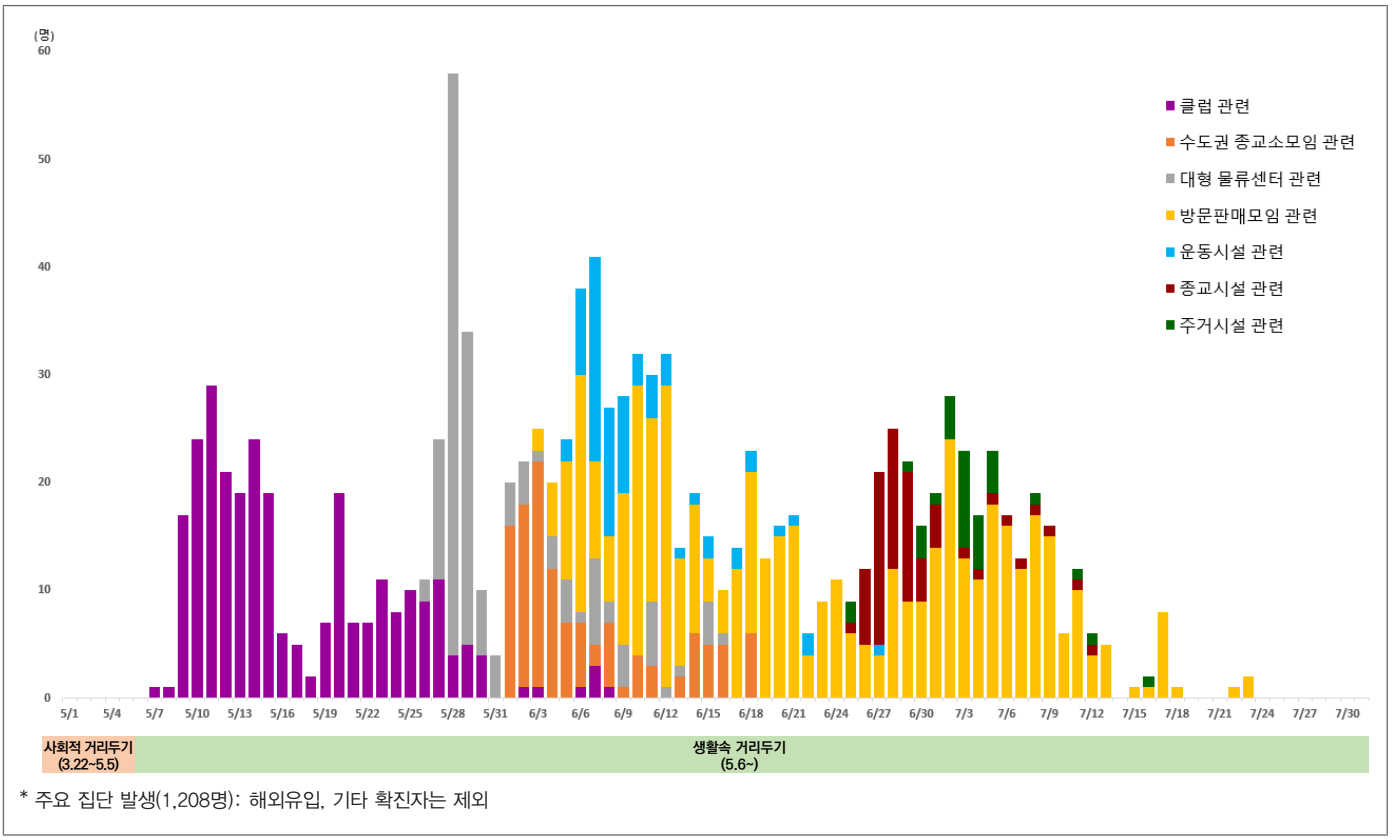
몸 말

1. 성, 연령, 지역별 발생 및 사망 특성

확진자의 성별은 여자가 54.8%로 남자보다 많이 발생하였으며, 인구 10만 명당 발생률은 27.6명이었다. 연령별로는 20대가 25.3%로 가장 많았고 그 다음으로는 50대가 17.6%였다. 지역별로는 대구 48.5%, 서울 11.2%, 경기 10.8%, 경북 9.8% 순으로, 대구·경북 및 수도권을 중심으로 많은 확진자가 발생했음을 알 수 있다. 지역별

표 1. 코로나19 성, 연령, 지역별 발생 및 사망 분포(누적)

구분	2020. 1. 20. ~ 7. 31. 0시 기준					
	발생				사망	
	총 합계 (명, %)	국내감염 (명, %)	해외유입 (명, %)	인구 10만 명당 발생률 (%)	사망자 (명, %)	치명률 (%)
성						
남자	6,463 (45.2)	4,911 (41.2)	1,552 (64.8)	25.0	160 (53.2)	2.5
여자	7,842 (54.8)	6,998 (58.8)	844 (35.2)	30.2	141 (46.8)	1.8
연령대						
10세 미만	246 (1.7)	176 (1.5)	70 (2.9)	5.9	–	–
10~19세	782 (5.5)	609 (5.1)	173 (7.2)	15.8	–	–
20~29세	3,620 (25.3)	2,779 (23.3)	841 (35.1)	53.2	–	–
30~39세	1,810 (12.6)	1,211 (10.2)	599 (25.0)	25.7	2 (0.7)	0.1
40~49세	1,930 (13.5)	1,565 (13.1)	365 (15.2)	23.0	3 (1.0)	0.2
50~59세	2,519 (17.6)	2,296 (19.3)	223 (9.3)	29.1	16 (5.3)	0.6
60~69세	1,853 (13.0)	1,749 (14.7)	104 (4.4)	29.2	41 (13.6)	2.2
70~79세	947 (6.6)	931 (7.8)	16 (0.7)	26.3	90 (29.9)	9.5
80세 이상	598 (4.2)	593 (5.0)	5 (0.2)	31.5	149 (49.5)	24.9
지역						
서울	1,600 (11.2)	1,260 (10.6)	340 (14.2)	16.4	11 (3.7)	0.7
부산	171 (1.2)	130 (1.1)	41 (1.7)	5.0	3 (1.0)	1.8
대구	6,940 (48.5)	6,881 (57.8)	59 (2.5)	284.8	191 (63.5)	2.8
인천	383 (2.7)	303 (2.5)	80 (3.3)	13.0	2 (0.7)	0.5
광주	204 (1.4)	179 (1.5)	25 (1.0)	14.0	2 (0.7)	1.0
대전	166 (1.2)	147 (1.2)	19 (0.8)	11.3	2 (0.7)	1.2
울산	59 (0.4)	34 (0.3)	25 (1.0)	5.1	1 (0.3)	1.7
세종	50 (0.3)	45 (0.4)	5 (0.2)	14.6	–	–
경기	1,546 (10.8)	1,137 (9.6)	409 (17.1)	11.7	31 (10.3)	2.0
강원	74 (0.5)	53 (0.4)	21 (0.9)	4.8	3 (1.0)	4.1
충북	73 (0.5)	56 (0.5)	17 (0.7)	4.6	–	–
충남	190 (1.3)	159 (1.3)	31 (1.3)	9.0	1 (0.3)	0.5
전북	39 (0.3)	18 (0.2)	21 (0.9)	2.1	–	–
전남	38 (0.3)	17 (0.1)	21 (0.9)	2.0	–	–
경북	1,401 (9.8)	1,369 (11.5)	32 (1.3)	52.6	54 (17.9)	3.9
경남	159 (1.1)	110 (0.9)	49 (2.1)	4.7	–	–
제주	26 (0.2)	11 (0.1)	15 (0.6)	3.9	–	–
검역	1,186 (8.3)	–	1,186 (49.5)	–	–	–
총 합계	**14,305 (100.0)**	**11,909 (100.0)**	**2,396 (100.0)**	**27.6**	**301 (100.0)**	**2.1**



* 주요 집단 발생(1,208명): 해외유입, 기타 확진자는 제외

그림 1. 최근 3개월 코로나19 일별 발생 현황(5.1.~7.31.)

인구 10만 명당 발생률은 대구 284.8명, 경북 52.6명, 서울 16.4명, 세종 14.6명, 광주 14.0명 순이었다.

사망자의 성별은 남자가 53.2%로 여자보다 많았으며, 치명률은 2.1%였다. 사망자의 93.0%가 60세 이상이었고, 연령이 높을수록 치명률이 증가하여 80세 이상에서의 치명률은 24.9%였다. 지역별로는 사망자 중 63.5%가 대구였고, 경북 17.9%, 경기 10.3% 순이었다(표 1).

2. 주요 집단별 발생 특성

5월 6일 사회적 거리두기에서 '생활 속 거리두기'로 전환한 이후, 현재까지 지역사회 소규모 또는 대규모 집단 감염 및 산발적인 감염 사례가 지속되고 있다. 최근 3개월 간 주요 집단별 발생 특성은 다음과 같다(그림 1, 표 2, 표 3, 표 4).

가. 클럽 관련(수도권)

서울의 한 클럽을 중심으로 다수의 확진자가 발생한 사례로, 확진자의 74.0%가 남자였고, 연령으로는 20대(44.0%)가 가장 많았다. 전국적으로 확진자가 보고되었으며, 서울(50.2%), 경기(21.3%), 인천(19.5%) 순으로 수도권에서 91%의 확진자가 발생하였다. 확진자의 평균 연령은 33.1세였고, 사망자는 없었다.

나. 종교소모임 관련(수도권)

인천 및 서울과 경기 일부 지역에서 성경모임, 목회자모임 등 각종 종교소모임을 통해 확진자가 발생한 사례로, 확진자의 58.0%가 여자였고, 연령으로는 60대(37.0%)가 가장 많았다. 수도권에서만 확진자가 발생하였고, 인천(47.9%), 서울(31.1%), 경기(21.0%) 순이었다. 확진자의 평균 연령은 55.9세였고, 집단 내

표 2. 최근 3개월 간 성별, 연령별 주요 집단 발생 분포

구분	2020. 5. 1. ~ 7. 31. 0시 기준							
	주요 집단 전체 (명, %)	클럽 관련 (명, %)	수도권 종교 소모임 관련 (명, %)	대형물류센터 관련 (명, %)	방문판매모임 관련 (명, %)	운동시설 관련 (명, %)	종교시설 관련 (명, %)	주거시설 관련 (명, %)
성별								
남자	605 (50.1)	205 (74.0)	50 (42.0)	71 (46.7)	184 (37.7)	38 (52.1)	33 (50.0)	24 (72.7)
여자	603 (49.9)	72 (26.0)	69 (58.0)	81 (53.3)	304 (62.3)	35 (47.9)	33 (50.0)	9 (27.3)
연령대								
10세 미만	24 (2.0)	5 (1.8)	1 (0.8)	6 (3.9)	11 (2.3)	–	1 (1.5)	–
10~19세	64 (5.3)	35 (12.6)	3 (2.5)	13 (8.6)	9 (1.8)	2 (2.7)	1 (1.5)	1 (3.0)
20~29세	234 (19.4)	122 (44.0)	6 (5.0)	28 (18.4)	41 (8.4)	6 (8.2)	24 (36.4)	7 (21.2)
30~39세	131 (10.8)	36 (13.0)	3 (2.5)	35 (23.0)	26 (5.3)	3 (4.1)	24 (36.4)	4 (12.1)
40~49세	111 (9.2)	23 (8.3)	11 (9.2)	24 (15.8)	40 (8.2)	9 (12.3)	3 (4.5)	1 (3.0)
50~59세	230 (19.0)	23 (8.3)	37 (31.1)	28 (18.4)	104 (21.3)	30 (41.1)	4 (6.1)	4 (12.1)
60~69세	267 (22.1)	27 (9.7)	44 (37.0)	13 (8.6)	148 (30.3)	13 (17.8)	7 (10.6)	15 (45.5)
70~79세	107 (8.9)	5 (1.8)	12 (10.1)	–	83 (17.0)	4 (5.5)	2 (3.0)	1 (3.0)
80세 이상	40 (3.3)	1 (0.4)	2 (1.7)	5 (3.3)	26 (5.3)	6 (8.2)	–	–
계	**1,208 (100.0)**	**277 (100.0)**	**119 (100.0)**	**152 (100.0)**	**488 (100.0)**	**73 (100.0)**	**66 (100.0)**	**33 (100.0)**
연령 평균	47.4세	33.1세	55.9세	39.2세	56.4세	54.6세	35.4세	49.8세
중위수 (최소~최대)	51세 (1~95세)	27세 (1~84세)	59세 (7~88세)	37세 (1~90세)	60세 (1~95세)	57세 (11~87세)	30세 (3~79세)	59세 (16~74세)

확진자 중 1명이 사망하였다.

다. 대형 물류센터 관련(수도권)

경기의 한 대형 물류센터에서 다수의 확진자가 발생한 사례로, 확진자의 53.3%가 여자였고, 연령으로는 30대(23.0%)가 가장 많았다. 수도권에서만 확진자가 발생하였고, 경기(44.1%), 인천(40.1%), 서울(15.8%) 순이었다. 확진자의 평균 연령은 39.2세였고, 집단 내 확진자 중 1명이 사망하였다.

라. 방문판매모임 관련(수도권, 광주, 대전)

방문판매모임으로부터 시작하여 각종 소규모 집단까지 확산되어 확진자가 발생한 사례로, 확진자의 62.3%가 여자였고, 연령으로는 60대(30.3%)가 가장 많았다. 서울, 광주, 대전 등 3개 지역에서 각각의 방문판매모임과 관련한 확진자는 광주(28.7%), 서울(26.6%), 경기(19.1%), 대전(11.5%) 순이었으며, 수도권 및 충청호남권 위주로 환자가 발생하였다. 방문판매모임 관련 확진자의 평균 연령은 56.4세였고, 집단 내 사망자는 총 7명(치명률 1.4%)이었으며 모두 60세 이상이었다.

마. 운동시설 관련(수도권)

서울의 한 탁구장을 통해 확진자가 발생한 사례로, 확진자의 52.1%가 남자였고, 연령으로는 50대(41.1%)가 가장 많았다. 수도권에서만 확진자가 발생하였고, 서울(60.3%), 경기(38.3%), 인천(1.4%) 순이었다. 확진자의 평균 연령은 54.6세였고, 집단 내 확진자 중 1명이 사망(치명률 1.4%)하였다.

바. 종교시설 관련(서울, 경기)

서울과 경기 두 곳의 종교시설에서 다수의 확진자가 발생한 사례로, 확진자의 성별 분포는 동일하였으며, 연령으로는 20대와

표 3. 최근 3개월 간 지역별 주요 집단 발생 분포

구분	2020. 5. 1. ~ 7. 31. 0시 기준							
	주요 집단 전체 (명, %)	클럽 관련 (명, %)	수도권 종교 소모임 관련 (명, %)	대형물류센터 관련 (명, %)	방문판매모임 관련 (명, %)	운동시설 관련 (명, %)	종교시설 관련 (명, %)	주거시설 관련 (명, %)
지역								
서울	415 (34.4)	139 (50.2)	37 (31.1)	24 (15.8)	130 (26.6)	44 (60.3)	31 (47.0)	10 (30.3)
부산	4 (0.3)	4 (1.4)	–	–	–	–	–	–
대구	2 (0.2)	2 (0.7)	–	–	–	–	–	–
인천	205 (17.0)	54 (19.5)	57 (47.9)	61 (40.1)	32 (6.6)	1 (1.4)	–	–
광주	140 (11.6)	–	–	–	140 (28.7)	–	–	–
대전	57 (4.7)	1 (0.4)	–	–	56 (11.5)	–	–	–
울산	–	–	–	–	–	–	–	–
세종	2 (0.2)	–	–	–	2 (0.4)	–	–	–
경기	329 (27.2)	59 (21.3)	25 (21.0)	67 (44.1)	93 (19.1)	28 (38.3)	35 (53.0)	22 (66.7)
강원	7 (0.6)	2 (0.7)	–	–	4 (0.8)	–	–	1 (3.0)
충북	9 (0.7)	9 (3.2)	–	–	–	–	–	–
충남	19 (1.6)	1 (0.4)	–	–	18 (3.7)	–	–	–
전북	7 (0.6)	2 (0.7)	–	–	5 (1.0)	–	–	–
전남	8 (0.7)	–	–	–	8 (1.6)	–	–	–
경북	1 (0.1)	1 (0.4)	–	–	–	–	–	–
경남	2 (0.2)	2 (0.7)	–	–	–	–	–	–
제주	1 (0.1)	1 (0.4)	–	–	–	–	–	–
계	**1,208 (100.0)**	**277 (100.0)**	**119 (100.0)**	**152 (100.0)**	**488 (100.0)**	**73 (100.0)**	**66 (100.0)**	**33 (100.0)**

표 4. 최근 3개월 간 주요 집단 발생 내 사망 분포

구분	2020. 5. 1. ~ 7. 31. 0시 기준							
	주요 집단 전체 (명)	클럽 관련 (명)	수도권 종교 소모임 관련 (명)	대형물류센터 관련 (명)	방문판매모임 관련 (명)	운동시설 관련 (명)	종교시설 관련 (명)	주거시설 관련 (명)
성								
남자	3	–	–	–	2	1	–	–
여자	7	–	1	1	5	–	–	–
연령대								
60~69세	1	–	–	–	1	–	–	–
70~79세	5	–	1	–	4	–	–	–
80세 이상	4	–	–	1	2	1	–	–
계	**10**	**–**	**1**	**1**	**7**	**1**	**–**	**–**
치명률 (%)	0.8	–	0.8	0.7	1.4	1.4	–	–

* 60세 미만 사망자 없음

30대가 각각 36.4%로 가장 많았다. 경기(53.0%), 서울(47.0%) 두 지역에서만 확진자가 발생하였다. 확진자의 평균 연령은 35.4세였고, 이 집단 중 사망자는 없었다.

사. 주거시설 관련(서울, 경기)

경기의 한 아파트를 중심으로 다수의 확진자가 발생한 사례로, 확진자의 72.7%가 남자였고, 연령으로는 60대(45.5%)가 가장 많았다. 경기(66.7%), 서울(30.3%), 강원(3.0%)으로 세 지역에서만 확진자가 발생하였다. 확진자의 평균 연령은 49.8세였고, 이 집단 중 사망자는 없었다.

맺는 말

우리나라는 2020년 1월 20일 국내 첫 확진자 발생 이후 2020년 7월 31일까지 총 14,305명의 환자가 발생하였다. 본 보고서에서는 최근 3개월 간 해외유입을 제외한 주요 집단 발생 특성을 살펴보고자 하였다.

지난 5월 초 연휴 이후에 생활 속 거리두기 전환을 기점으로 방문판매, 종교시설, 다중이용시설 등을 중심으로, 주로 수도권, 호남권에서 소규모 및 대규모 감염 사례가 계속 발생하였다. 국내 발생은 소규모 전파가 지속적으로 발생하고 있어, 국내 발생 전파 차단을 위해서는 방역수칙을 지속적으로 준수하는 것이 필요하다.

8월을 맞이하여 안전한 여름휴가를 보낼 수 있도록, 실내에서는 마스크를 상시 착용하고, 휴게소, 식당·카페 등 음식점에서는 최소시간 머무르며 음식물 섭취 시 외에는 대화를 자제하며, 손을 자주 씻고 거리두기도 계속 유지하는 것이 필요하다. 또한 발열이나 호흡기 증상이 있으면 여행가지 않고 집에 머무르며, 증상 악화 시 콜센터나 보건소에 문의하고, 밀폐·밀접한 장소나 혼잡한 여행지 및 시간대는 피하며, 침방울이 튀는 행위나 신체접촉은 자제해야 한다.

지역사회 감염을 차단하기 위해서는 일상에서 항상 방역수칙을 준수하는 것이 중요하다. 감염 위험이 높은 장소 및 시설에 대해, 보다 적극적인 방역 대책을 마련할 필요성이 있다.

① 이전에 알려진 내용은?

2020년 1월 중국에서 코로나19 발생이 보고된 이후, 우리나라뿐만 아니라 전 세계적으로 환자 발생이 지속적으로 보고되고 있다.

② 새로이 알게 된 내용은?

우리나라의 코로나19 확진자는 7월 31일 기준 총 14,305명 발생하였고, 그 중 301명이 사망하였다. 5월 초 생활 속 거리두기 전환 이후 발생한 지역사회 주요 집단 감염 사례별 특성을 살펴보았고, 지역사회에서 방역을 강화해야 할 집단이 어떤 것들이 있는 지 알 수 있었다.

③ 시사점은?

중앙방역대책본부는 「감염병예방법」에 의해 의료기관 등에서 코로나19 환자 등을 신고하고, 중앙 및 지자체 역학조사반이 역학조사 한 결과를 바탕으로, 최근 3개월 간 우리나라의 코로나19 환자 주요 집단 발생 동향을 분석하고 결과를 공유하여, 앞으로의 코로나19 발생에 보다 효과적인 대응전략 및 방역 조치 수립에 활용할 수 있게 하였다.

참고문헌

1. WHO. Coronavirus disease (COVID-2019) Situation reports – 193 [31 JULY 2020], Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports
2. KCDC [internet]. Available from: http://ncov.mohw.go.kr.
3. 질병관리본부 코로나바이러스감염증-19 중앙방역대책본부. 한국 초기 코로나바이러스감염증-19 환자 28명의 역학적 특성. 주간 건강과 질병. 2020;13(9):464-474.

Abstract

Coronavirus Disease-19 (COVID-19) 3-month outbreak infection report as of July 31, 2020, in the Republic of Korea

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Case and Contact Management Task Force, Central Disease Control Headquarters

This 3-month report (May 1, 2020 to July 31, 2020) on the Coronavirus Disease-19 (COVID-19) situation in Korea was conducted by the disease management division of the Korea Centers for Disease Control and Prevention (KCDC). This report was based on the number of confirmed cases reported through the integrated system in accordance with Article 11 of the 「Infectious Disease Prevention and Management Act」 and on epidemiological investigations conducted by central and local health authorities.

By July 31, 2020, there were 14,305 confirmed cases of COVID-19; including 301 deaths. Confirmed cases were reported in all 17 provinces and provinces and cities in Korea, with the highest number of cases recorded in the provinces of Gyeonggi and Gyeongbuk and in the cities of Daegu and Seoul. The majority of these cases were from cluster outbreaks.

The major cluster outbreaks confirmed by epidemiological investigation over a 3-month period included nightclubs, religious gatherings (e.g., SMR churches), logistics centers (e.g., Coupang), door-to-door sales gatherings, exercise facilities (e.g., Yangcheon sports facility), church facilities (e.g., Lord Glory Church, Wangsung church) and residential facilities (e.g., Uijeongbu apartment).

Keywords: 2019 Novel Coronavirus (2019-nCoV), Coronavirus Disease-19 (COVID-19), Outbreaks, Epidemiological monitoring, Epidemiological investigation, Distancing in daily life

Table 1. The number of confirmed/deceased cases and the incidence rate

	January 20, 2020 – July 31, 2020					
	Confirmed cases				Deaths	
	Total (n, %)	Domestic cases (n, %)	Imported cases (n, %)	Incidence rate (n, per 0.1M population)	Total (n, %)	Fatality rate
Gender						
Male	6,463 (45.2)	4,911 (41.2)	1,552 (64.8)	25.0	160 (53.2)	2.5
Female	7,842 (54.8)	6,998 (58.8)	844 (35.2)	30.2	141 (46.8)	1.8
Age group (yrs)						
≤9	246 (1.7)	176 (1.5)	70 (2.9)	5.9	–	–
10–19	782 (5.5)	609 (5.1)	173 (7.2)	15.8	–	–
20–29	3,620 (25.3)	2,779 (23.3)	841 (35.1)	53.2	–	–
30–39	1,810 (12.6)	1,211 (10.2)	599 (25.0)	25.7	2 (0.7)	0.1
40–49	1,930 (13.5)	1,565 (13.1)	365 (15.2)	23.0	3 (1.0)	0.2
50–59	2,519 (17.6)	2,296 (19.3)	223 (9.3)	29.1	16 (5.3)	0.6
60–69	1,853 (13.0)	1,749 (14.7)	104 (4.4)	29.2	41 (13.6)	2.2
70–79	947 (6.6)	931 (7.8)	16 (0.7)	26.3	90 (29.9)	9.5
≥80	598 (4.2)	593 (5.0)	5 (0.2)	31.5	149 (49.5)	24.9
Region						
Seoul	1,600 (11.2)	1,260 (10.6)	340 (14.2)	16.4	11 (3.7)	0.7
Busan	171 (1.2)	130 (1.1)	41 (1.7)	5.0	3 (1.0)	1.8
Daegu	6,940 (48.5)	6,881 (57.8)	59 (2.5)	284.8	191 (63.5)	2.8
Incheon	383 (2.7)	303 (2.5)	80 (3.3)	13.0	2 (0.7)	0.5
Gwangju	204 (1.4)	179 (1.5)	25 (1.0)	14.0	2 (0.7)	1.0
Daejeon	166 (1.2)	147 (1.2)	19 (0.8)	11.3	2 (0.7)	1.2
Ulsan	59 (0.4)	34 (0.3)	25 (1.0)	5.1	1 (0.3)	1.7
Sejong	50 (0.3)	45 (0.4)	5 (0.2)	14.6	–	–
Gyeonggi	1,546 (10.8)	1,137 (9.6)	409 (17.1)	11.7	31 (10.3)	2.0
Gangwon	74 (0.5)	53 (0.4)	21 (0.9)	4.8	3 (1.0)	4.1
Chungbuk	73 (0.5)	56 (0.5)	17 (0.7)	4.6	–	–
Chungnam	190 (1.3)	159 (1.3)	31 (1.3)	9.0	1 (0.3)	0.5
Jeonbuk	39 (0.3)	18 (0.2)	21 (0.9)	2.1	–	–
Jeonnam	38 (0.3)	17 (0.1)	21 (0.9)	2.0	–	–
Gyeongbuk	1,401 (9.8)	1,369 (11.5)	32 (1.3)	52.6	54 (17.9)	3.9
Gyeongnam	159 (1.1)	110 (0.9)	49 (2.1)	4.7	–	–
JeJu	26 (0.2)	11 (0.1)	15 (0.6)	3.9	–	–
Airport Screening	1,186 (8.3)	–	1,186 (49.5)	–	–	–
Total	**14,305 (100.0)**	**11,909 (100.0)**	**2,396 (100.0)**	**27.6**	**301 (100.0)**	**2.1**

Table 2. Case status and the distribution by age and gender of the major clusters (3-month period)

	May 1, 2020 – July 31, 2020							
	Major clusters Total (n, %)	Nightclubs (n, %)	Religious gatherings: SMR churches (n, %)	Logistics centers: Coupang (n, %)	Door-to-door sales gatherings (n, %)	Exercise facilities: Yangcheon sports facility (n, %)	Church facilities * (n, %)	Residential facilities: Uijeongbu apartment (n, %)
Gender								
Male	605 (50.1)	205 (74.0)	50 (42.0)	71 (46.7)	184 (37.7)	38 (52.1)	33 (50.0)	24 (72.7)
Female	603 (49.9)	72 (26.0)	69 (58.0)	81 (53.3)	304 (62.3)	35 (47.9)	33 (50.0)	9 (27.3)
Age group (yrs)								
≤9	24 (2.0)	5 (1.8)	1 (0.8)	6 (3.9)	11 (2.3)	–	1 (1.5)	–
10-19	64 (5.3)	35 (12.6)	3 (2.5)	13 (8.6)	9 (1.8)	2 (2.7)	1 (1.5)	1 (3.0)
20-29	234 (19.4)	122 (44.0)	6 (5.0)	28 (18.4)	41 (8.4)	6 (8.2)	24 (36.4)	7 (21.2)
30-39	131 (10.8)	36 (13.0)	3 (2.5)	35 (23.0)	26 (5.3)	3 (4.1)	24 (36.4)	4 (12.1)
40-49	111 (9.2)	23 (8.3)	11 (9.2)	24 (15.8)	40 (8.2)	9 (12.3)	3 (4.5)	1 (3.0)
50-59	230 (19.0)	23 (8.3)	37 (31.1)	28 (18.4)	104 (21.3)	30 (41.1)	4 (6.1)	4 (12.1)
60-69	267 (22.1)	27 (9.7)	44 (37.0)	13 (8.6)	148 (30.3)	13 (17.8)	7 (10.6)	15 (45.5)
70-79	107 (8.9)	5 (1.8)	12 (10.1)	–	83 (17.0)	4 (5.5)	2 (3.0)	1 (3.0)
≥80	40 (3.3)	1 (0.4)	2 (1.7)	5 (3.3)	26 (5.3)	6 (8.2)	–	–
Total	**1,208 (100.0)**	**277 (100.0)**	**119 (100.0)**	**152 (100.0)**	**488 (100.0)**	**73 (100.0)**	**66 (100.0)**	**33 (100.0)**
Mean (yrs)	47.4	33.1	55.9	39.2	56.4	54.6	35.4	49.8
median (min-max)	51 (1 – 95)	27 (1 – 84)	59 (7 – 88)	37 (1 – 90)	60 (1 – 95)	57 (11 – 87)	30 (3 – 79)	59 (16 – 74)

* Church facilities: Lord Glory Church, Wangsung church

Table 3. Case status and the distribution by region of the major clusters (3–month period)

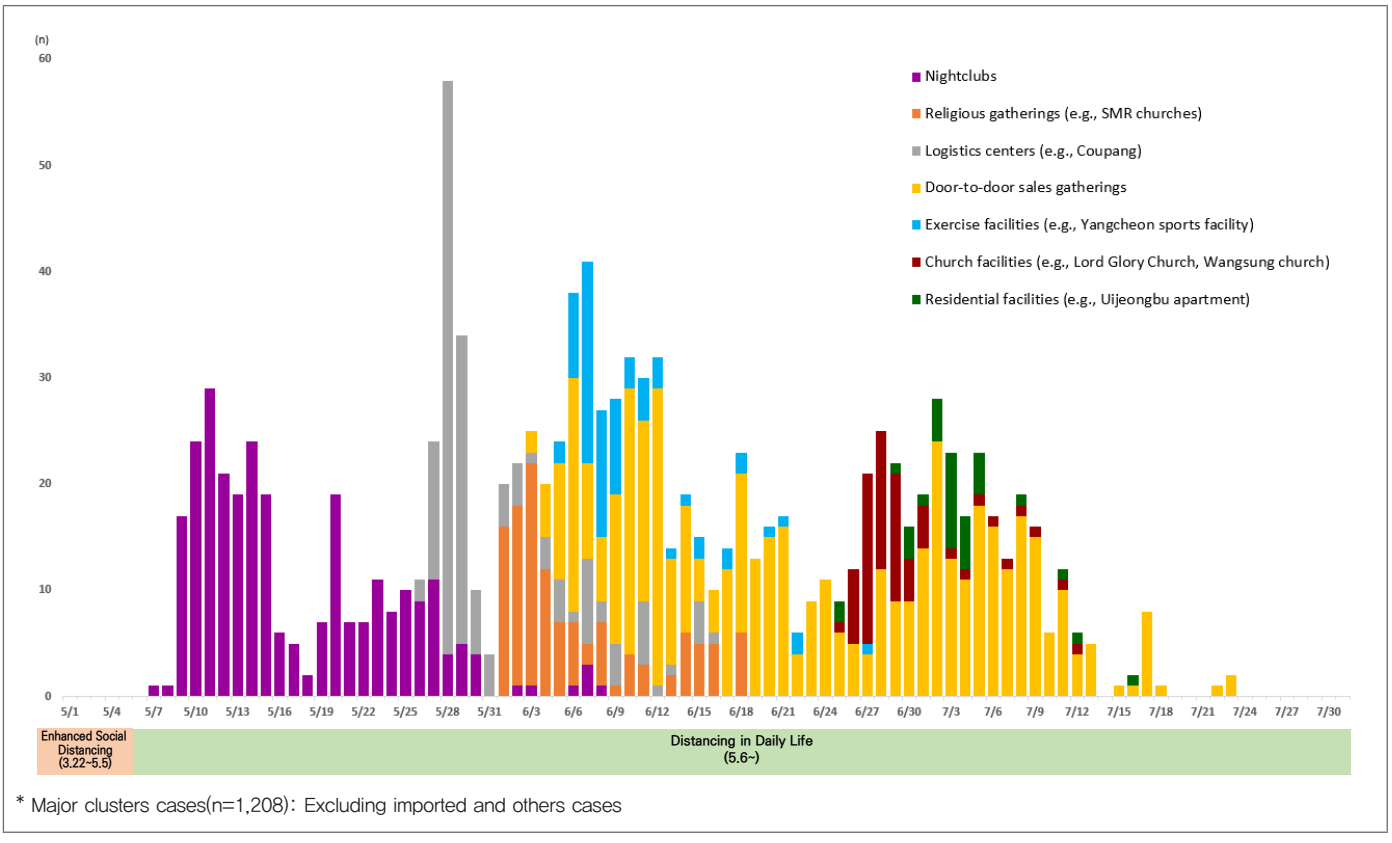
	May 1, 2020 – July 31, 2020							
	Major clusters Total (n, %)	Nightclubs (n, %)	Religious gatherings: SMR churches (n, %)	Logistics centers: Coupang (n, %)	Door–to–door sales gatherings (n, %)	Exercise facilities: Yangcheon sports facility (n, %)	Church facilities * (n, %)	Residential facilities: Uijeongbu apartment (n, %)
Region								
Seoul	415 (34.4)	139 (50.2)	37 (31.1)	24 (15.8)	130 (26.6)	44 (60.3)	31 (47.0)	10 (30.3)
Busan	4 (0.3)	4 (1.4)	–	–	–	–	–	–
Daegu	2 (0.2)	2 (0.7)	–	–	–	–	–	–
Incheon	205 (17.0)	54 (19.5)	57 (47.9)	61 (40.1)	32 (6.6)	1 (1.4)	–	–
Gwangju	140 (11.6)	–	–	–	140 (28.7)	–	–	–
Daejeon	57 (4.7)	1 (0.4)	–	–	56 (11.5)	–	–	–
Ulsan	–	–	–	–	–	–	–	–
Sejong	2 (0.2)	–	–	–	2 (0.4)	–	–	–
Gyeonggi	329 (27.2)	59 (21.3)	25 (21.0)	67 (44.1)	93 (19.1)	28 (38.3)	35 (53.0)	22 (66.7)
Gangwon	7 (0.6)	2 (0.7)	–	–	4 (0.8)	–	–	1 (3.0)
Chungbuk	9 (0.7)	9 (3.2)	–	–	–	–	–	–
Chungnam	19 (1.6)	1 (0.4)	–	–	18 (3.7)	–	–	–
Jeonbuk	7 (0.6)	2 (0.7)	–	–	5 (1.0)	–	–	–
Jeonnam	8 (0.7)	–	–	–	8 (1.6)	–	–	–
Gyeongbuk	1 (0.1)	1 (0.4)	–	–	–	–	–	–
Gyeongnam	2 (0.2)	2 (0.7)	–	–	–	–	–	–
JeJu	1 (0.1)	1 (0.4)	–	–	–	–	–	–
Total	**1,208 (100.0)**	**277 (100.0)**	**119 (100.0)**	**152 (100.0)**	**488 (100.0)**	**73 (100.0)**	**66 (100.0)**	**33 (100.0)**

* Church facilities: Lord Glory Church, Wangsung church

Table 4. Death status and the distribution by age and gender of the major clusters (3-month period)

	May 1, 2020 – July 31, 2020							
	Major clusters Total (n)	Nightclubs (n)	Religious gatherings: SMR churches (n)	Logistics centers: Coupang (n)	Door-to-door sales gatherings (n)	Exercise facilities: Yangcheon sports facility (n)	Church facilities (n)	Residential facilities: Uijeongbu apartment (n)
Gender								
Male	3	–	–	–	2	1	–	–
Female	7	–	1	1	5	–	–	–
Age group (yrs) *								
60–69	1	–	–	–	1	–	–	–
70–79	5	–	1	–	4	–	–	–
≥80	4	–	–	1	2	1	–	–
Total	10	–	1	1	7	1	–	–
Fatality rate	0.8	–	0.8	0.7	1.4	1.4	–	–

* No deaths under the age of 60



* Major clusters cases(n=1,208): Excluding imported and others cases

Figure 1. The progression of major cluster outbreak from May 1 to July 31, 2020

COVID-19 Special Issue 1

A COVID-19 Outbreak in A County, Republic of Korea

Chungnam Center for Infectious Diseases Control and Prevention

Abstract

A total of eleven coronavirus infection-19 (COVID-19) cases were reported on April 5th, 2020 after the first confirmed case was reported in A County on March 24th, 2020. A County is Chungcheongnam-do Province. The Chungcheongnam-do rapid response team and the A County Health Center conducted an epidemiological survey to identify the outbreak, determine the extent of the outbreak, prevent transmission, and prevent further outbreaks.

This report examined the epidemiological investigation process of the eleven confirmed case by using the data of the A County Health Center and the on-site epidemiological investigation report of the rapid response team. In addition, this report calculated and analyzed the general characteristics.

The report found that nine out of the eleven confirmed cases occurred at a church gathering. Furthermore, an epidemiological survey confirmed that some of the church's congregation wore masks with inadequate protection and many worshippers did not observe social distancing. A complete survey was conducted on April 1st for the individuals who attended the last worship which is on March 22nd to confirm cases and then conducted total complete survey on April 3rd for the rest in the church, but there were no additional confirmed cases. Out of the eleven cases, one was an imported case and one was a confirmed case from a community with no epidemiological connection.

The report found the following general characteristics of the eleven confirmed cases. There were-five males (45.5%) and, six females (55.5%). The average age was 49.8 (21-78) with a median age of 48. Ten cases were domestic (90.9%), and one case was an imported case from Britain (9.1%). In terms of initial symptoms, six cases (25.0 %) had fever or heat sensation, five had cough or sputum (20.8 %), and four patients (16.7 %) had chills. The initial symptoms of the confirmed cases were mostly minor and non-specific and were not significantly much different from known COVID-19 cases. A total of 121 people were classified according to the guidelines as contact persons of the eleven confirmed cases. The contact cases were managed by A County Health Center. This report concluded that locations that foster large gatherings, such as those found in religious facilities, must be managed by establishing effective response strategies and by sharing epidemiological and clinical analysis data on COVID-19.

Keywords: Coronavirus Disease-19 (COVID-19), Church, Outbreaks, Epidemiological monitoring

Introduction

In South Korea, by midnight on April 12, 2020, a total of 10,537 positive cases of coronavirus disease 2019 (COVID-19) had been recorded, with 217 deaths [1]. From the first reported case on January 20 to February 20, when an outbreak related to the Shincheonji religious group started, the average number of new positive cases per day was 1.5 [2]. However, with the surge in cases due to the community outbreak among Shincheonji followers in the Daegu and Gyeongbuk region, the number of new cases per day peaked at 813 on February 29. Subsequently, the central government's infection control and social distancing measures reduced the number of new cases, which dropped to 25 by April 13. However, additional localized outbreaks have been

reported in relation to closed spaces where close contact among people occurs for a prolonged period of time, such as a church in Seongnam, a church in Suwon, and a church in Busan. Similarly, outbreaks have been reported in other countries in closed spaces where frequent person-to-person contact occurs, such as a jail in China and residential care facilities in the United States [3].

Chungcheongnam-do Province first reported a case in Gyeryong on February 21, and subsequently had outbreaks of 102 cases in relation to a Zumba dance facility in Cheonan and eight cases in the Seosan industrial complex. On April 10, 138 positive cases were reported. A community outbreak in relation to a church was identified during the epidemiological investigation of 11 positive cases in A County from March 24 to April 5. Nine cases were tied to the church, one case was imported, and one case was due to an unrelated community infection. This report presents the results of the epidemiological investigation of 11 COVID-19 cases in A County from March 24 to April 5, 2020. The process of the epidemiological investigation is described using data from the A County health clinic and the field epidemiological investigation report from the rapid response team. General characteristics, the epidemic curve, and relationship diagrams were calculated for analysis.

Result

Process of the epidemiological investigation

The first and second positive cases in A County, Chungcheongnam-do Province on March 24 were a married couple. Case #1 had experienced muscle pain and fever since March 20. After a few days, the symptoms worsened, so the patient remained at home without going out. The patient suspected COVID-19 infection once the symptoms did not improve and tested positive for COVID-19 at a testing center in a hospital in A County on March 23. Case #2 experienced fever starting on March 21 and tested positive together with case #1. Case #1 did not report any activities outside of the home since a day prior to symptom onset, and contact tracing was conducted to determine the location of exposure (e.g., the workplace, church, home, or the supermarket that case #2 visited). The final list of contacts included two family members, 32 employees in the workplace (an insurance company), two insurance clients, and four church members.

The third positive case identified on March 27 was a contact of case #2. Case #3 was already in quarantine at home, so the three family members that shared the home were classified as contacts. The fourth case, who was identified on the same day, was an imported case that did not have epidemiological relevance to the church.

The epidemiological investigation concluded that the fifth positive case identified on March 30 was not linked to the church and classified the case as unidentified community infection.

The epidemiological investigation of case #6, who was identified on March 31, confirmed that case #6 attended the same church as cases #1 to #3. The identified contacts of case #6 included one family member, one medical provider (as case #6 visited a medical facility), two other patients at the medical facility, and one acquaintance. Case #7, who was identified on the same day, was a contact of case #2 who was already in quarantine and did not have any further contacts.

On April 1, COVID-19 was detected in two other church members (cases #8 and #9). The epidemiological investigation of case #8 identified one family member and two shop owners in a market as contacts. For case #9, the contacts included one family member, six people in a restaurant, one person in a hair salon, and one acquaintance.

Case #11, who was identified on April 5, was the spouse of case #6 and a member of the church related to the outbreak. 4on April 1, but subsequently experienced COVID-19 symptoms and received a second test on April 5 that came back positive. Case #11 did not have any further contacts.

The number of contacts of the 11 confirmed cases was 121, including 13 family members who lived with the positive cases, 33 colleagues, four church members, 13 acquaintances, and 49 community contacts. Those who were listed as contacts were ordered to quarantine for 14 days by the health clinic. If the contacts experienced COVID-19-related symptoms during self-quarantine, they could immediately get tested at a testing site. The locations visited by the confirmed cases were sterilized immediately.

Among the 11 confirmed cases in A County that were identified from March 24 to April 5, 2020, nine were related to the church, with the rest being one imported case and one epidemiologically unrelated case of unidentified community

Table 1. Demographic characteristics of eleven COVID-19 confirmed cases in A County, Republic of Korea (n=11)

Characteristics		n	%
Sex			
	Male	5	45.5
	Female	6	55.5
Age			
	20–29	1	9.1
	30–39	2	18.2
	40–49	3	27.3
	50–59	2	18.2
	60–69	1	9.1
	≥70	2	18.2
	Mean±SD	49.8±16.5 (Median 48.0)	
Nationality			
	Korean	10	90.9
	The United Kingdom	1	9.1
Sings and Symptoms at on onset (can be duplicated)			
Respiratory Symptom			
	Fever, Heat sensation	6	25.0
	Sore Throat	2	8.3
	Cough or Sputum	5	20.8
	Runny nose	1	4.1
Other symptoms			
	Muscle ache	3	12.5
	Chills	4	16.7
	Vomiting	2	8.3
	Headache	1	4.1

infection. While investigating the cases related to the outbreak in the church, it was identified that social distancing was not adhered to inside the church and that some church members did not wear masks properly. Thus, the common exposure date was set as March 22, which was the date of the last service. When two of the church members were first identified as COVID-19 cases, the risk exposure for those who attended the same service on the same date was regarded as low, so the entire church was not designated as at risk. However, since COVID-19-positive cases were reported both among church members identified as contacts and those who were not identified as contacts, all 190 church members who attended the service on March 22 were tested, and two additional positive cases were identified. To find hidden infection cases, all 390 registered members of the church, including 190 who attended the service on March 22, were tested, but there were no further positive cases. The list of church members was compared to the list of Shincheonji followers, but none of the church members were associated with the Shincheonji religious group. The remaining two of the 11 total positive cases were checked for relevance to the church. One case started experiencing symptoms on the same day as arrival and thus did not have any epidemiological relationship with the church. The other case was a church-goer, but went to a different church that did not have epidemiological relevance to the church where the outbreak was identified.

Since the date of symptom onset only differed by one day between case #1 and #2, who were a married couple and shared a daily routine, it was hypothesized that they were infected by an unknown index case and started the outbreak. In order to investigate the exact route of infection, global positioning system (GPS), which is a satellite location system, and Drug Utilization Review (DUR), which is a service to ensure the safety of drug prescriptions, records were analyzed. The results suggested that cases #1 and #2 had no history of traveling abroad or to Daegu and did not visit any locations other than the ones reported.

General Characteristics

Among the 11 confirmed cases, five were male (45.5%), and six were female (55.5%). The mean, median, and range of age

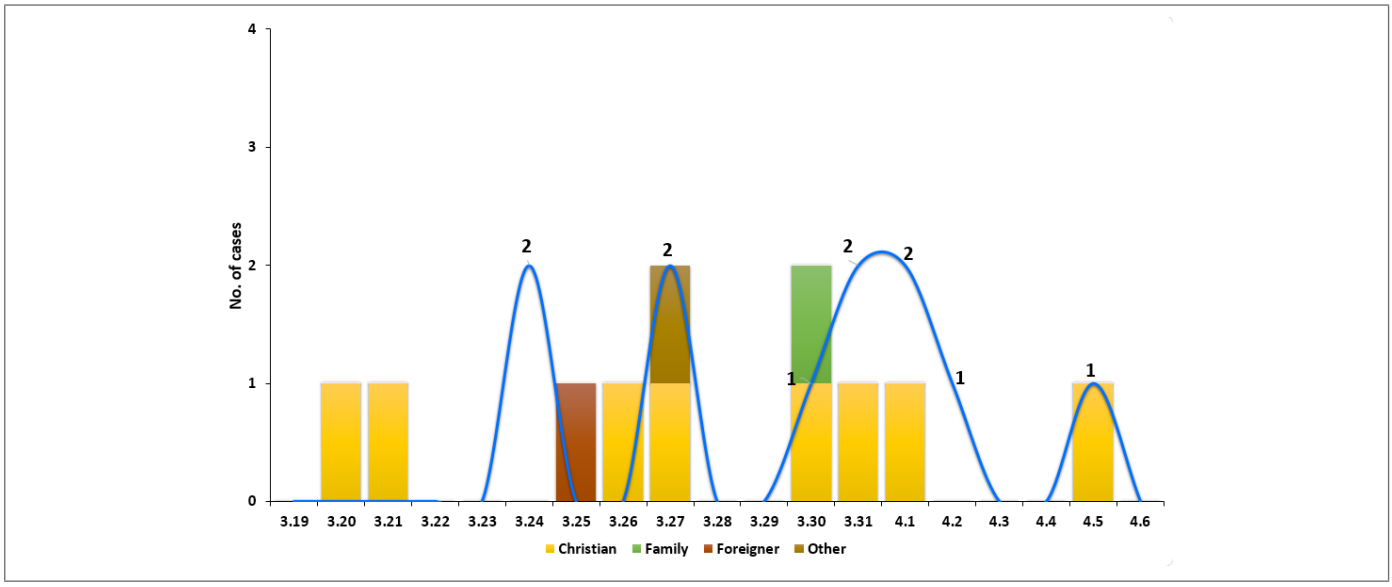


Figure 1. The epidemiological curves of the Signs and symptoms of the eleven COVID-19 cases at the onset date in A County, Republic of Korea

were 49.8 years, 48 years, and 21 to 78 years, respectively. Three cases were in their 40s (27.3%); two were in their 30s, 50s, and 70s, respectively (18.2% in each category); and one each was in their 20s or 60s (9.1% in each category). Ten of the patients were A County residents, and one was British. The initial symptoms reported by the confirmed cases were fever or heat sensation in six cases (25.0%), cough or phlegm in five cases (20.8%), chills in four cases (16.7%), muscle pain in three cases (12.5%), sinus pressure in two cases (8.3%), vomiting in two cases (8.3%), and one case each for runny nose and headache (4.1% each) (Table 1).

Epidemic Curve

The first symptoms were recorded on March 20, 2020, and the onset of symptoms (bar graph) continued through April 5, with a relatively even distribution throughout this period. The dates of the positive tests (line graph) were also dispersed like the onset of symptoms, with two positive tests from March 20 to 21, four from March 25 to 27, four from March 30 to April 1, and one on April 5 (Figure 1).

Relationship Diagram

As shown in the relationship diagram of the 11 confirmed cases in A County, Chungcheongnam-do Province from March 24 to April 5, cases #1 and #2 were infected by an unknown index case. Cases #3 and #7, who were in the church broadcast room with case #2 during the March 22 church service, tested positive. Cases #8 and #9, who attended the same service on the same day and sat directly in front of and behind case #6 in the worship room, also tested positive. Family members of case #6 (case #11) and case #9 (case #10) were infected. Case #4 was an

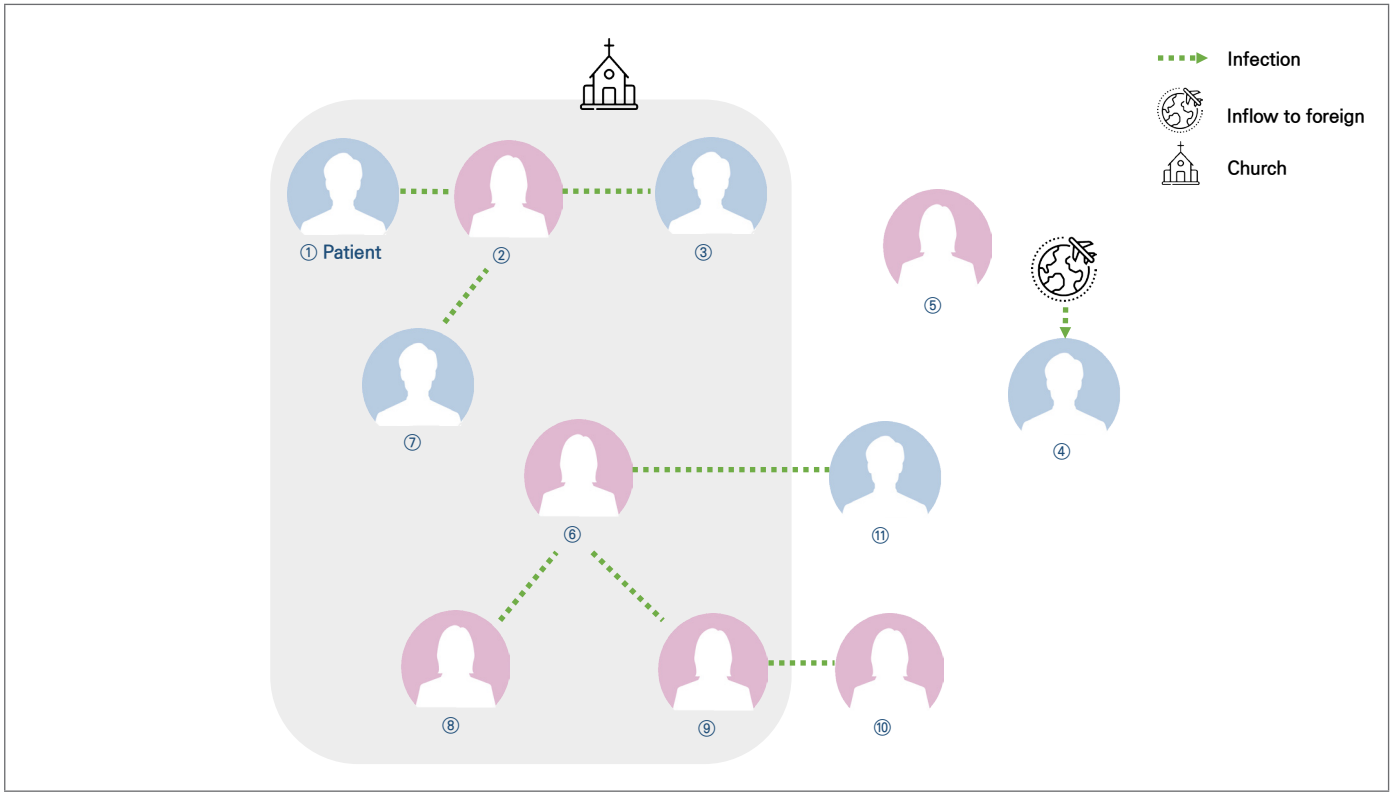


Figure 2. Relationship diagram of the first Coronavirus Disease-19 (COVID-19) cases in A County, Republic of Korea

imported case, from whom no community infections resulted. Case #5 was infected from an unknown case, did not show epidemiological relevance to the church where the outbreak occurred, and did not result in further community infection (Figure 2).

Conclusion

From March 24 to April 5, 2020, 11 COVID-19 cases were confirmed in A County. Nine of these cases occurred in relation to a church, and the remaining two occurred sporadically. In the church where the outbreak was identified, the initial infections occurred through religious activities among church members, and the infection was transmitted to the families of church members, resulting in an outbreak. This finding demonstrates that ordinary religious activities in various religious groups, not just Shincheonji activities, can lead to outbreaks of COVID-19. Religious activities in church include reading Bible verses aloud and singing hymns in a closed space with close contact and little to no movement for about 1 hour. Since COVID-19 is transmitted through droplets, these characteristics make an outbreak highly likely if a church member is infected with COVID-19. The remaining two cases were an imported case and an infection from an unknown source with no epidemiological relation to the church. The sex ratio among the 11 confirmed cases was even, and the age range was broad. The primary symptoms were consistent with known COVID-19 symptoms, including high rates of fever or heat sensation and respiratory symptoms such as cough and phlegm.

The vast majority (81.5%) of all COVID-19 cases in South Korea (as of April 13) were related to community outbreaks in spaces where many people are concentrated and droplets are easily produced, such as religious groups, care facilities and hospitals, and call centers. In the church in A County where the outbreak occurred, a high risk of exposure to droplets was identified, as there was less than 2 m of distance between church members and suboptimal mask wearing [1].

Although the rate of new COVID-19 cases is reducing in response to control measures by the central government and intense social distancing measures, local outbreaks can occur anywhere, and in order to prevent further outbreaks, it is necessary to analyze and share the processes of epidemiological investigation and epidemiological information from any outbreaks that occur, including these confirmed cases in A County, Chungcheongnam-do Province.

During the epidemiological investigation, the response guideline was revised on April 2, and the criterion for identifying contacts was revised from those who contacted a case 1 day before symptom onset to those who contacted a case 2 days before symptom onset. If the epidemiological investigation of the first patients in A County had initially been conducted according to the revised guidelines, everyone who subsequently was identified as positive from the church community would have been classified as contacts, and early detection and minimization of contacts would have been possible.

Although the number of COVID-19 cases in South Korea is showing a downward trend, the occurrence of multiple localized outbreaks associated with church groups shows that the spread of COVID-19 in religious facilities should be contained by avoiding in-person services, recommending online services, and making sure that COVID-19 prevention measures (wearing masks, checking temperature, social distancing, sterilizing the space, using hand sanitizers, and listing participants) are adhered to during in-person services. The results of this study were based on the results of the epidemiological investigations that have been conducted so far, meaning that the results of the analysis might change depending on further investigation.

Acknowledgement

We thank patients who participated in the case study of this outbreak and the Chungcheongnam-do Province quarantine and response headquarters (HyeonOk Baek, MinKyo Cheon, HoYeong Lee, YeongRim Jeong, HyeonGi Lee, YongMi Kim, JeongDong Sin, WonTae Cho, GwanYong Jeong) who contributed to the epidemiological investigation and response.

① What was previously known?

Local outbreaks of COVID-19 in religious groups in South Korea started with the religious activities of the Shincheonji group.

② What is newly added?

The report demonstrated that usual religious activities in various religious groups can lead to an outbreak of COVID-19. Religious activities in church include reading Bible verses aloud and singing hymns in a closed space with close contact and little to no movement for about 1 hour. Since COVID-19 is transmitted through droplets, these characteristics make an outbreak highly likely if a church member is infected.

③ Implications?

Since there have been several outbreaks related to churches, the spread of COVID-19 in religious facilities should be contained by avoiding in-person services, recommending online services, and making sure that COVID-19 prevention measures (wearing masks, checking temperature, social distancing, sterilizing the space, using hand sanitizers, and listing participants) are adhered to during in-person services.

Reference

1. KCDC [internet]. Available from: http://ncov.mohw.go.kr.
2. Chungnam Center for Infectious Diseases Control and Prevention; Epidemiology & Case Management Team, COVID-19 National Emergency Response Center, KCDC. Investigation of COVID-19 outbreaks through Zumba dance classes in Korea. Public Health Weekly Report. 2020;13(13):726-736.
3. Moran Ki & Task Force for 2019-nCoV. Epidemiologic characteristics of early cases with 2019 novel coronavirus (2019-nCoV) disease in Republic of Korea. Epidemiol Health. February 9, 2020:e2020007. doi: 10.4178/epih.e2020007.

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COVID-19 Special Issue 2

Quarantine Response to COVID-19: The COVID-19 National Quarantine Station at Incheon Airport

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Abstract

The purpose of this report was to present the characteristics of the quarantine response to COVID-19 by analyzing indicators at the Incheon Airport National Quarantine Station (the IANQS). In 2020, quarantine in South Korea gradually strengthened following the global spread of COVID-19. As a result, the daily number of inbound travelers decreased, but the collection rate of health declaration forms (HDFs) reached 96.6 percent of those who entered South Korea.

The target period for analysis was from January 2nd to May 15th, 2020 and the main results are as follows.

First, the total number of quarantine targets was 5,690,933, and the collected number of HDFs was 892,918. A total of 405 patients including the first confirmed patient (#1) were confirmed by the IANQS among patients under investigation (PUIs) who were detected at the quarantine phase.

Second, cases with COVID-19 symptoms were affected by the outbreak trends of the departure country. From January to the end of February 2020, the majority of cases with symptoms departed from China, and after March, the number of cases with symptoms increased significantly due to the spread of COVID-19 in Europe and the United States. Flight analyses showed the same results that the percentage of PUI passengers was high in flights from departure cities with high prevalence.

Third, 84% of 404 confirmed cases from March 14th to May 15th, 2020 had been in Europe and the United States.

Keywords: COVID-19, Quarantine, Imported case, Airport

Introduction

After the first cases of pneumonia of unknown origin were reported from Wuhan, Hubei Province, China on December 31, 2019, the Incheon Airport National Quarantine Station implemented heightened quarantine procedures on January 3, 2020. On January 19, 2020, the first confirmed coronavirus disease 2019 (COVID-19) case in Korea was categorized as a patient under investigation (PUI) during the quarantine process, transferred and isolated in a designated isolation ward, and confirmed to be infected with COVID-19 on the next day. As COVID-19 spread across China, the quarantine station installed assessment clinics inside the arrival hall of Incheon Airport starting on January 28, 2020. The Incheon Airport National Quarantine Station began to offer COVID-19 polymerase chain reaction (PCR) testing on January 31, and 405 cases of COVID-19 were confirmed during quarantine processing at the Incheon Airport National Quarantine Station as of May 15, 2020, including the first confirmed case in Korea.

This report presents an analysis of the COVID-19 quarantine response at Incheon Airport from January 2, 2020, the day prior

to the implementation of heightened quarantine measures, until May 15, 2020. The timeframe for the analysis was determined based on significant trends in situational fluctuations.

Result

Changes in quarantine subjects

A quarantine subject is defined as any person who is required to submit a health declaration form when seeking entry to South Korea. Travelers who need to submit health declaration forms are determined by the designation of a quarantine control region (formerly, quarantinable disease risk areas) or other policy measures of the government.

On January 20, 2020, when the first confirmed case was reported, the government elevated the epidemic threat level to yellow and issued instructions for a heightened response. When the threat level was raised to orange on January 27, all travelers from China (except Hong Kong and Macau) were required to submit health declaration forms. The threat level was then raised to red on February 24. As confirmed cases surged around Europe, the compulsory submission of health declaration forms expanded to entrants from Iran and Italy on March 11, travelers from five European states (the United Kingdom, France, Germany, the Netherlands, and Spain) on March 15, and travelers from all European countries on March 16. On March 12, the World Health Organization declared the COVID-19 outbreak to be a pandemic. As the number of confirmed cases imported from foreign countries has grown, the Korean government has implemented stricter quarantine measures, requiring all persons entering South Korea to submit health declaration forms.

The daily average number of travelers in January was 106,534. However, the number of people seeking entry to South Korea drastically dropped since February, when stricter quarantine measures came into force. However, the proportion of travelers required to complete health declaration forms rose to 96.6% in May (May 1 to May 15, 2020). This figure includes connecting passengers who did not land in Korea according to the KCDC Integrated System. Excluding connecting passengers, 100% of travelers entering South Korea have been required to submit health declaration forms since March 19 (Table 1).

The requirement to submit health declaration forms was limited to travelers from quarantinable disease risk areas until January 28, 2020. During this period, on average, 11,041 forms were submitted per day (January 2 to January 26, 2020).

Table 1. No. of Daily Inbound Travelers, Collection of Health Declaration Forms (HDFs), Collection Rate of Health Declaration Forms (HDFs)

(N, %)

Period	Average No. of Daily Inbound Travelers*	Average No. of Daily HDF Collection	Average Rate of HDF Collection
Jan. (2020.1.2.~2020.1.31.)	106,534	11,957	11.3
Feb. (2020.2.1.~2020.2.29.)	65,657	6,695	9.9
March (2020.3.1.~2020.3.31.)	12,445	4,526	45.9
April (2020.4.1.~2020.4.30.)	4,867	4,637	95.5
May (2020.5.1.~2020.5.15.)	3,938	3,801	96.6

*Including transit

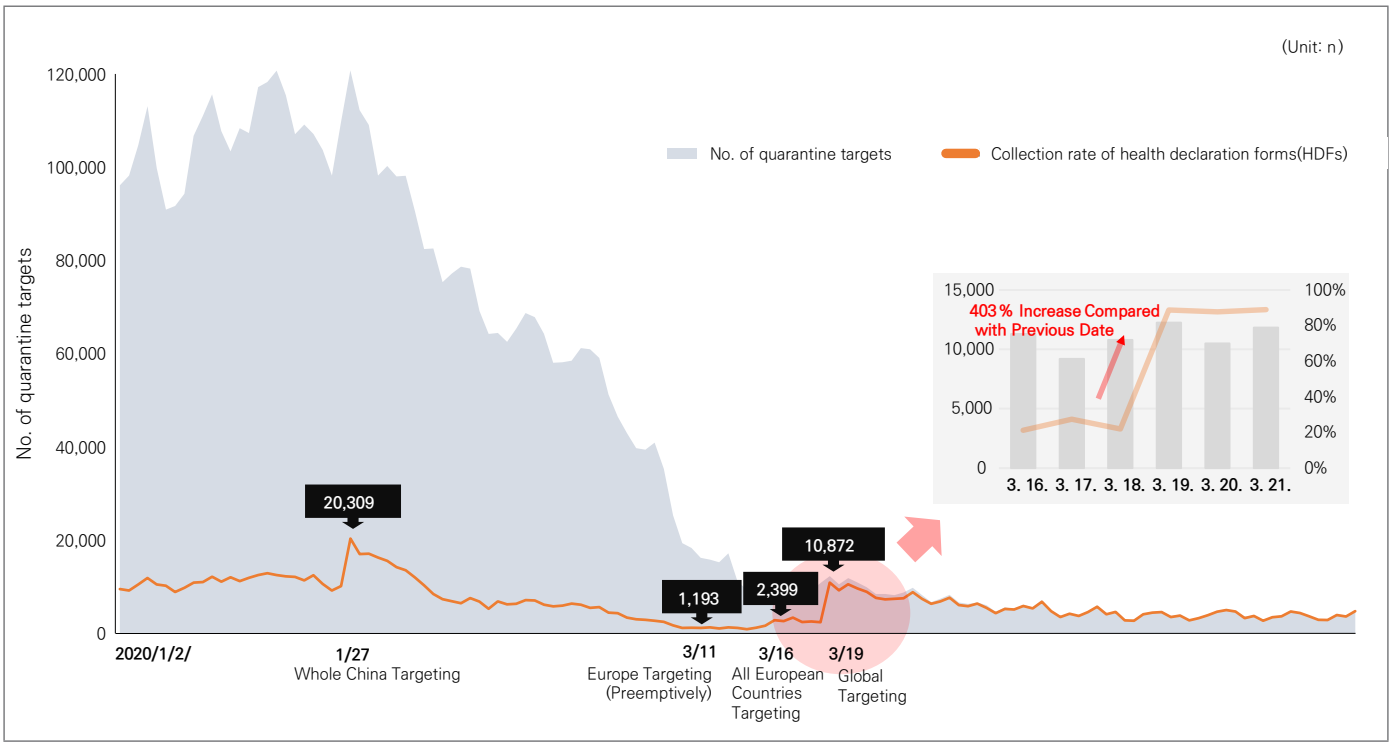

Figure 1. Total number of inbound travelers and the collection rate of health declaration forms (HDFs)

However, as the disease risk areas were expanded and stricter quarantine measures were implemented by the Incheon Airport National Quarantine Station, the number of required forms rose by 10,202 to 20,309 on January 27. Even though the concentrated quarantine measures for transit countries targeting MERS and Ebola, as well as the cholera risk area, were temporarily suspended to focus efforts on the response to COVID-19, the average daily number of health declaration forms remained 16,469 from January 28 to January 31.

Europe experienced large-scale spread of COVID-19 during March. Based on this situation, the Incheon Airport National Quarantine Station promptly decided to require health declaration forms from airline travelers originating from Europe. The required number of health declaration forms rose from 1,193 on March 11 to 1,620 on March 12 and 2,788 on March 13. The government requirement of health declaration forms officially came into force on March 16, when we required 2,399 forms. The number of required forms on March 19, when the requirement was extended to all travelers, rose by 8,500 compared to March 18, with 10,872 forms. The proportion of travelers required to submit forms spiked by 403% from March 18 to March 19, from 22.0% to 88.7% (Fig. 1).

Status of quarantine response for PUIs[1] from major countries

Quarantine measures started to be implemented in response to COVID-19 on January 3, 2020. At that time, COVID-19 had been reported in the vicinity of Wuhan in Hubei Province, China; therefore, quarantine measures were mainly imposed on

1) A person who indicated on the health declaration form that he or she had experienced symptoms (fever, chills, headache, etc.), took medicine related to the symptoms, visited a local clinic or had come into contact with animals, or had an unrecognized fever detected by thermal monitoring.

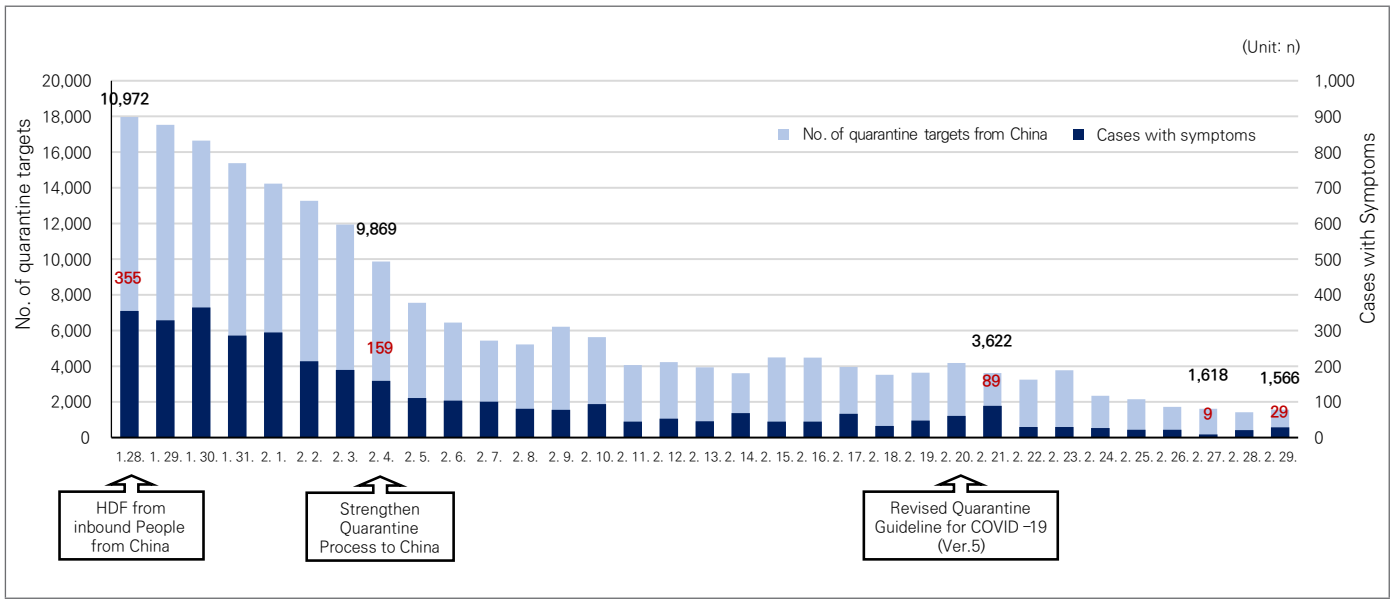

Figure 2. Intensive Quarantine Period for Inbound Travelers from China (January 28 – February 29, 2020)

flights from Wuhan, China. However, only a small proportion of travelers were from Wuhan, compared to those from the entire territory of China, so this report focuses on the quarantine measures implemented after January 28, when the quarantinable disease risk area was expanded to the entirety of China (except Hong Kong and Macau).

A. Stricter quarantine measures for travelers from China (January 28 to February 29, 2020)

As the quarantinable disease risk area was expanded from the previously designated five provinces and cities of China to the entirety of mainland China (except Hong Kong and Macau) on January 27, 2020, the Korea Centers for Disease Control tried to prevent the influx of the disease by temporarily suspending concentrated quarantine measures for transit countries targeting Ebola and MERS.

However, entries originating from China had already been declining, especially after February 4, when even stricter quarantine measures were introduced for people inbound from China. As such, the number of PUIs also declined. There were 355 PUIs among travelers from China on January 28, but the number dropped to 9 on February 27. In the last week of the month (February 24 to February 29), the average number of PUIs was 21.6, and the proportion of PUIs among all travelers from China remained around 1.2% (Fig 2).

The number of PUIs increased temporarily on February 21, 2020; we believe that the updated definition of PUIs[2)] in February 2020 affected the likelihood of triage during assessment.

B. Concentrated quarantine efforts for travelers from European countries (March 1 to March 19, 2020)

In March, COVID-19 began to spread in Europe, centered around Italy, and the Incheon Airport National Quarantine Station prepared to respond. On March 11, Iran and Italy

2) "Suspected case of COVID-19 based on doctor's opinion" was added to the definition of PUIs in the fifth edition of the COVID-19 quarantine response instructions.

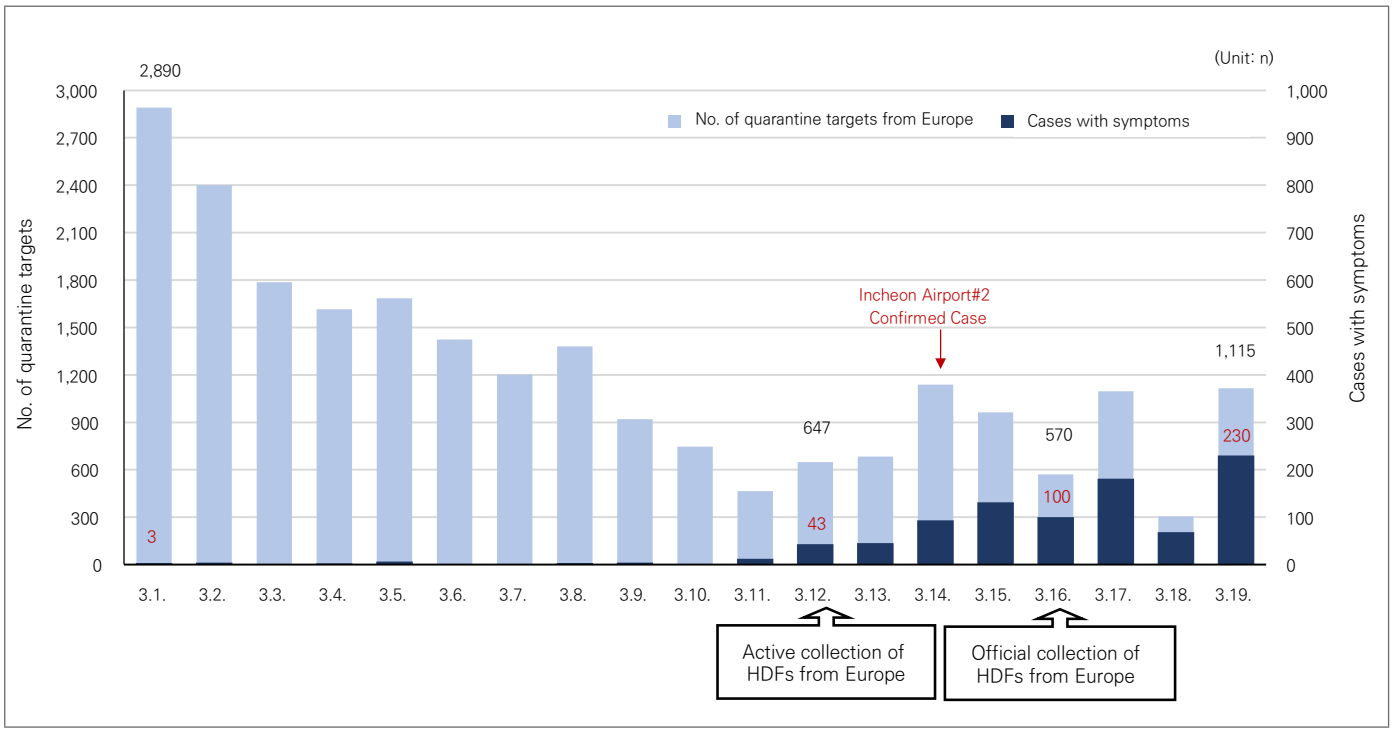

Figure 3. Intensive Quarantine Period for Inbound Travelers from Europe (March 1 – March 19, 2020)

were added to the quarantine control regions, and the Incheon Airport National Quarantine Station proactively required health declaration forms for passengers on flights originating from Europe (including some Middle Eastern origin flights[3]) and one traveler who entered the Czech Republic was confirmed to have COVID-19 during quarantine processing at Incheon Airport on March 14. Therefore, the health declaration form became mandatory for travelers from all European states. While the number of entry attempts rose and fell based daily fluctuations in flight operations, the proportion of PUIs continued to rise before the health declaration form requirement was extended to all travelers worldwide (March 19) (Fig. 3).

C. Concentrated quarantine efforts for European and American travelers (March 19 to April 18, 2020)

The government mandated health declaration form submission for all travelers from anywhere in the world on March 19, 2020. We analyzed the number of travelers and PUIs from Europe and the United States, where COVID-19 was particularly prevalent during that time.

The average daily number of PUIs from Europe and the United States before March 19 remained around 175 people (3.6%). However, as quarantine requirements began to be imposed on all travelers, the number of PUIs from Europe and the United States spiked to 474, with an increase of 401 cases compared to the day prior (March 18). The rate of PUIs jumped to 12.8% of all travelers originating from Europe and the United States (Fig. 4).

These results imply that people with COVID-19 symptoms from the United States may have slipped through quarantine processing by not submitting a health declaration form. The

3) This term refers to flights originating from the UAE or Qatar bound for Incheon International Airport. Health declaration forms had already been collected from those flights due to MERS quarantine procedures, but an increasing number of passengers used Qatar and UAE connections as many direct flights from Europe were disrupted.

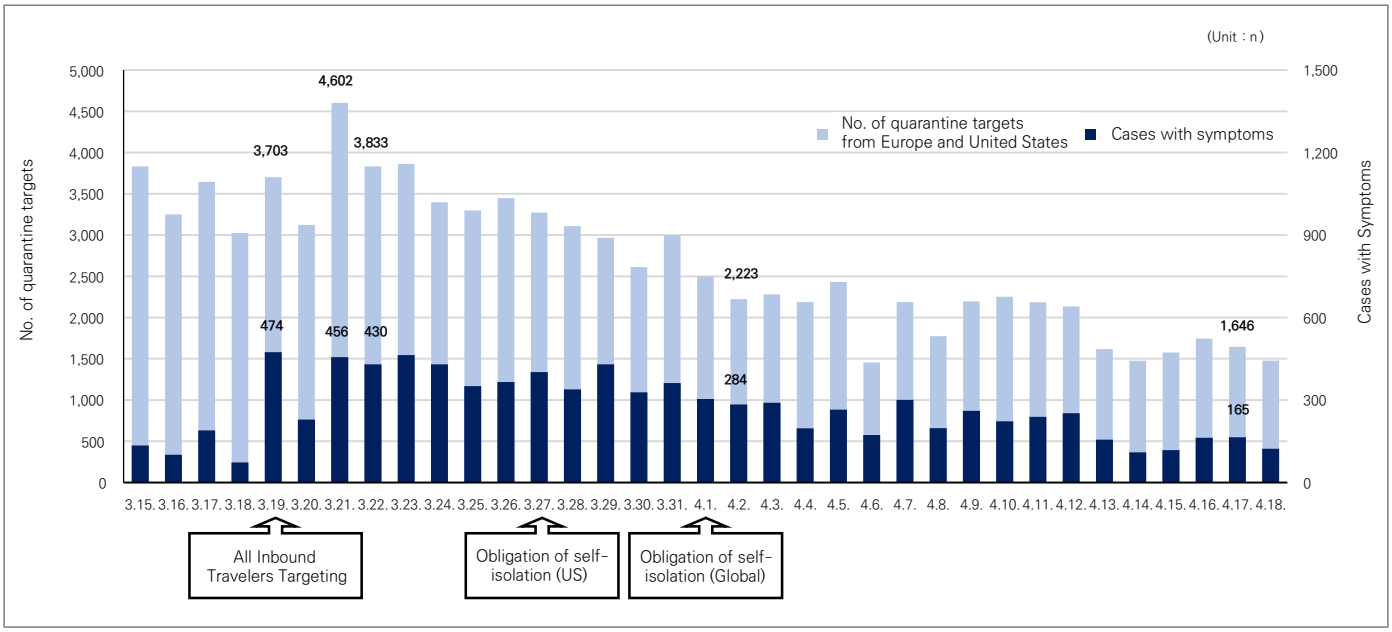

Figure 4. Intensive Quarantine Period for Inbound travelers from Europe and the United States (March 15 – April 18, 2020)

number of entries from Europe and the United States decreased to 2,223 persons on April 2, two weeks after stricter quarantine measures were imposed, corresponding to around 60% of prior entry attempts. However, the average proportion of PUIs remained 11% to 12% on average. As imported COVID-19 cases increased, particularly from Europe and the United States, the government imposed mandatory isolation for admitted travelers, starting with European travelers on March 24, expanding to travelers from the United States on March 27, and then including all travelers from outside of Korea beginning on April 1.

Passenger and PUI status for major originating cities

As different nations experienced the peak of the COVID-19 outbreak, the distribution of PUIs based on the originating city also changed. Thus, we analyzed the number of passengers and PUIs on flights from the major originating cities (London, Paris, New York, and the Middle East [Doha and Abu Dhabi]) during different periods. We included flights from the Middle East because we confirmed that many travelers who had entered Europe connected through flights from the Middle East as a detour due to the disruption of commercial flight services directly from Europe. In order to examine the characteristics of imported COVID-19 cases, we determined the dates when flights carrying passengers operated, and then analyzed the changes in passengers and PUIs.

A. The proportion of PUIs among travelers from major originating cities

The highest proportion of PUIs relative to entry attempts via major commercial flight routes was found during the third and fourth weeks of March and the first and second weeks of April for flights from Europe. Notably, the proportion of PUIs on flights from Paris on March 23 spiked to 33.7%, and the proportion remained above 10% into the third and fourth weeks of April (Table 2).

Table 2. Cases with Symptoms Compared with the Number of Inbound Travelers from High Prevalence Countries and Cities

(N, %)

Period	Departure Country & City	Europe		USA	Middle East
		London	Paris	New York	(Doha, Abu Dhabi)
March	1–2 Week (3.01.~3.15.)	3.6	3.2	1.0	7.6
	3–4 Week (3.16.~3.31.)	18.3	24.5	8.3	23.1
April	1–2 Week (4.01.~4.15.)	18.8	23.0	11.4	14.8
	3–4 Week (4.16.~4.30.)	15.1	18.6	6.7	12.0
May	1–2 Week (5.01.~5.15.)	9.4	18.9	4.4	6.8

B. Changes in trends for each originating city

We looked into changes in the numbers of travelers and PUIs on flights from major cities (London, Paris, New York, and those in the Middle East), and the results were as follows (Fig. 5).

Flights from London, UK were operated three times per week by two airlines. Flights originating from Paris, France were operated by one airline, with two to three flights per week. For the London-origin flights, while the number of travelers varied by date, the highest number of passengers entered between March 27 and March 29 during the period of interest. In particular,

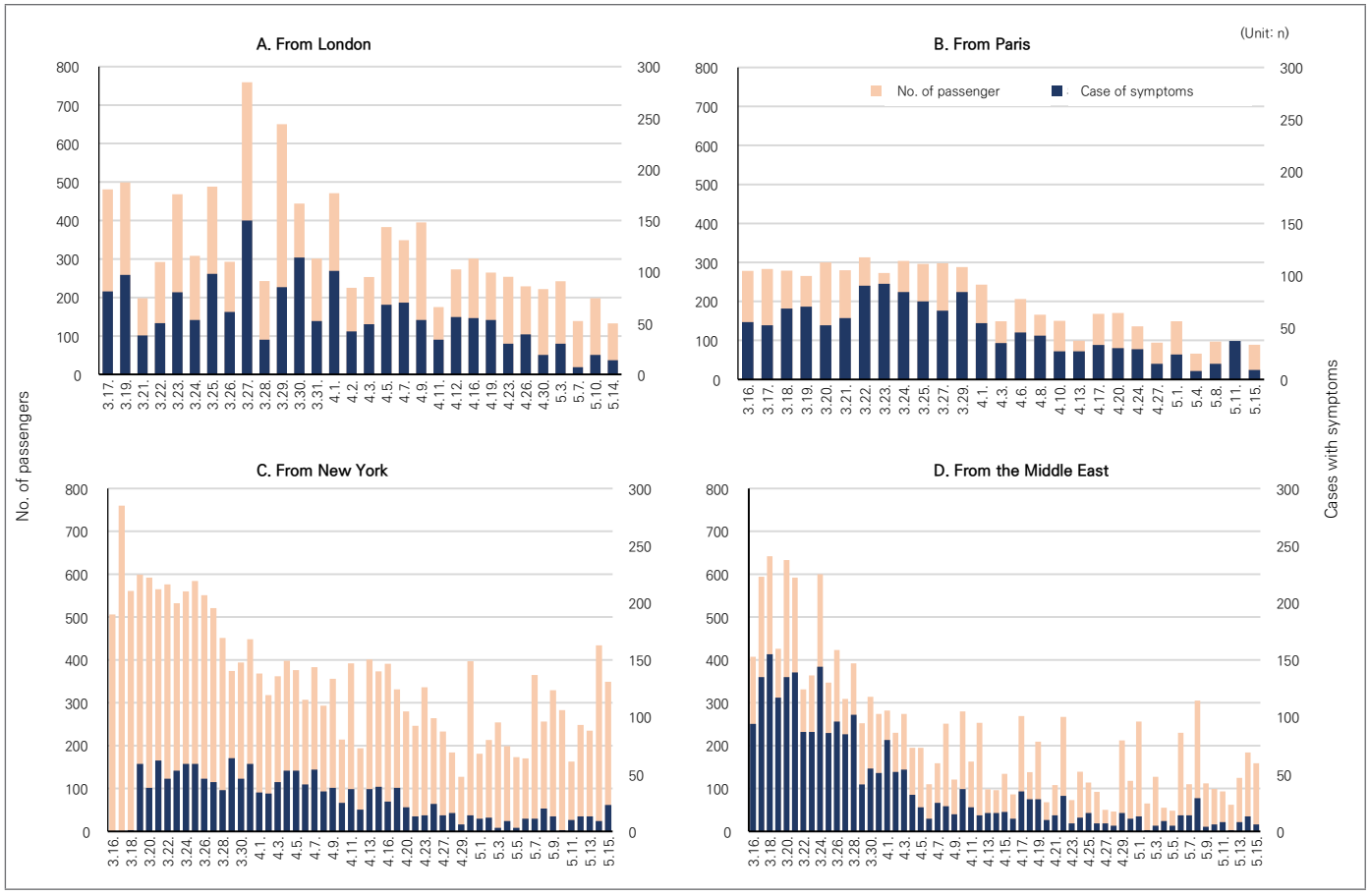

Figure 5. The Number of Inbound Travelers from High Prevalence Countries and Cities and Cases with Symptoms

150 travelers from London were classified as PUIs on March 27. For the flights originating from Paris, the number of entry attempts remained approximately 300 until the end of March. The proportion of PUIs rose to 33.7% on March 23. On that date, there were 273 people, with 92 reported PUIs.

Flights from New York were operated by two airlines, with five to seven flights per week on average. Only one to three PUIs per day were reported from March 1 to March 18. However, as stricter quarantine procedures were imposed, the number of PUIs rose to 59 on March 19. Since then, the number of PUIs from New York remained generally stable from March 16 to April 15, with an average of 40.4 people, and only started to decline in mid-April.

Due to the impact of European sojourners, flights originating from the Middle East continued to have a high proportions of PUIs; notably, on March 18, there were 155 PUIs (24.1%) among 642 passengers. This trend continued into early April, with 100.6 PUIs on average between March 16 and March 31. Then, the proportion of PUIs started to decline, with averages of 28.7 people during the first half of April (April 1 to April 15) and 15.7 people during the second half of April (April 16 to April 30).

Status of testing and confirmed cases of COVID-19 during quarantine processing at Incheon Airport

A. Testing and confirmed cases (daily, cumulative) during quarantine processing at Incheon Airport

The Incheon Airport National Quarantine Station installed an assessment clinic within the airport on January 28 to prevent the influx of COVID-19. The assessment clinic conducted COVID-19 PCR tests on its premises, with 14,178 tests performed through May 15. We aggregated the confirmed cases from March 14, when the second confirmed case was reported from quarantine processing at the airport, with the following results (Fig. 6).

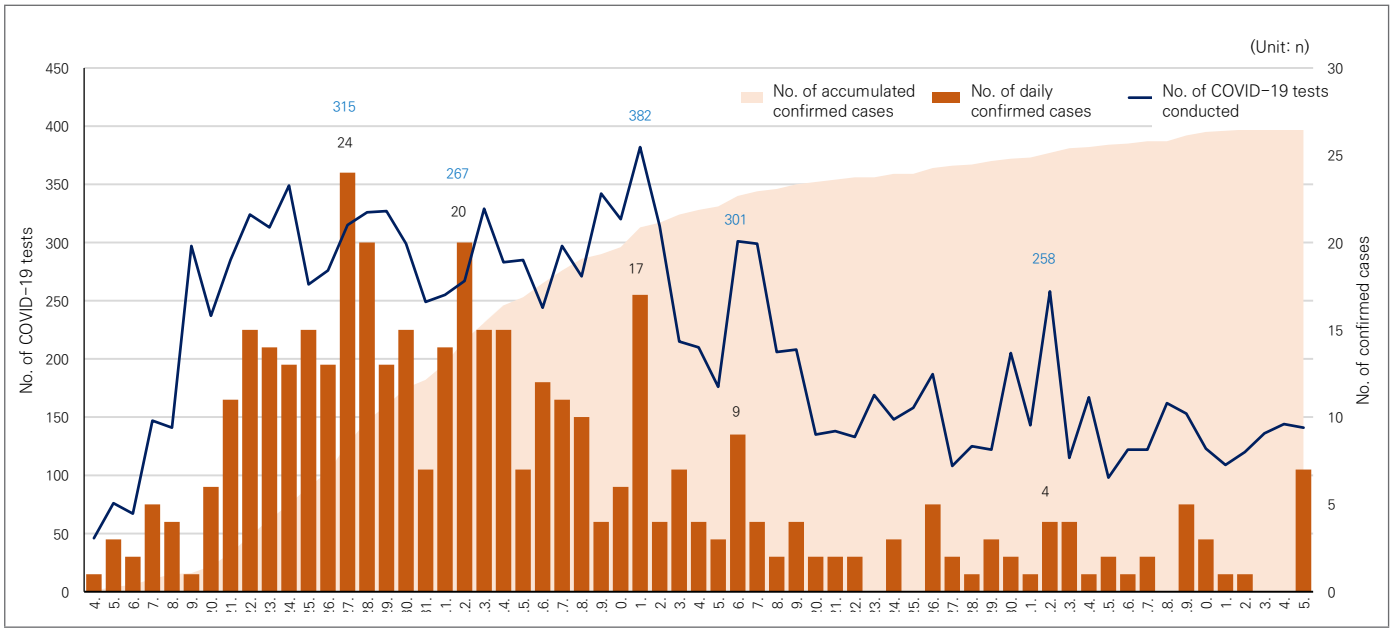

Figure 6. The Number of COVID19 Tests Conducted and the Number of Confirmed Cases (Accumulation, Daily)

The number of tests changed as the number of PUIs entering quarantine processing fluctuated. It steadily rose since March 14, when a confirmed case was reported among travelers from Europe. On March 27, 315 tests were administered with 24 confirmed cases; this was the day with the most confirmed cases reported by the station. Subsequently, the number of tests and confirmed cases remained high until mid-April, with a daily average of 294 tests from March 20 to April 10, but declined starting in mid-May.

B. Geographic origin of confirmed cases reported during quarantine processing at Incheon Airport

The regions of origin from which the confirmed cases reported during the Incheon airport quarantine phase (404 cases) are presented below (Fig. 7). Although there were 404 confirmed cases, we analyzed 408 cases[4] due to duplication of regions of origin. The United States was the most common point of origin (179 cases, 43.9%) followed by Europe (160 cases, 39.2%), the Middle East (16 cases, 3.9%), Asia (36 cases, 8.8%), and others (17 cases, 4.2%).[5] This is commensurate with the fact that the majority of imported cases were from the United States or Europe.

In an analysis of changes in the regions of origin of confirmed cases, many were initially from European countries, but as time progressed, more confirmed cases were from the United States. International trends in the spread of the COVID-19 pandemic were analyzed by tracking the dates where the most confirmed cases arrived from various regions. On March 27, among 24 confirmed cases, 18 were from Europe, five were from the United States, and one was from Thailand. On April 11, among 17 confirmed cases, two were from Europe, 12 were

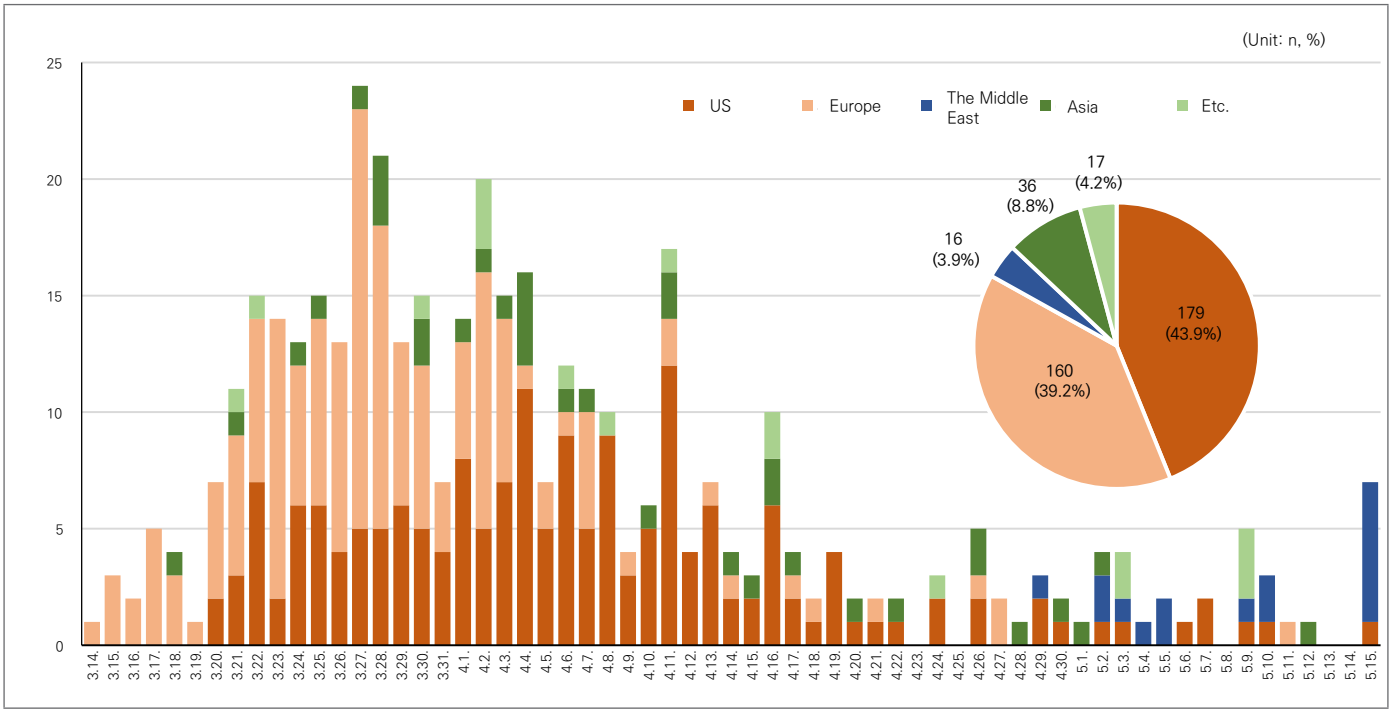

Figure 7. The Departure Countries of Confirmed Cases

4) One duplicate case of the US and Europe, and 3 cases of the US and others were reported.

5) Including North America (except the United States), South America, and Africa.

from the US, two were from Japan, and one was from Canada. After May, many confirmed cases arrived from the Middle East, because quarantine measures were heightened due to mass outbreaks at construction sites in the Middle East region.

PUIs in quarantine processing and measures to treat confirmed patients

A. PUI processing procedures

COVID-19 PUIs identified in Incheon Airport are tested in one of two ways. A sample is obtained either after transferring a PUI to a negative-pressure isolation facility within the Central Quarantine Medical Support Center or on-site in the arrival hall after triage. In principle, PUIs are taken to negative-pressure isolation facilities if they exhibit typical symptoms of COVID-19, if they are suffering a relatively severe onset of illness, or if a sample must be taken from the lower respiratory tract. Otherwise, PUIs are tested on-site at the arrival hall, with individual isolation performed in a temporary waiting room.

As the number of PUIs spiked due to the COVID-19 pandemic, we required a waiting space where PUIs are directed to isolate while waiting for their test results. Hence, the Incheon Airport National Quarantine Station rented 3 temporary waiting facilities. Fewer PUIs were directed to negative-pressure isolation facilities after we began utilizing temporary waiting areas, which could be attributed to the better health status of travelers from foreign countries. Most of the cases (94.3%, 13,365 tests) only required a sample from the upper respiratory tract, as they did not exhibit symptoms such as excessive mucus production.

The number of PUIs and COVID-19 confirmed cases continued to decline since mid-April, so the Incheon Airport National Quarantine Station gradually scaled back the operations of the temporary waiting areas. Currently, we are operating one temporary waiting area in addition to negative-pressure isolation facilities. The records of COVID-19 PUI processing in quarantine processing at Incheon Airport are presented below (Fig. 8).

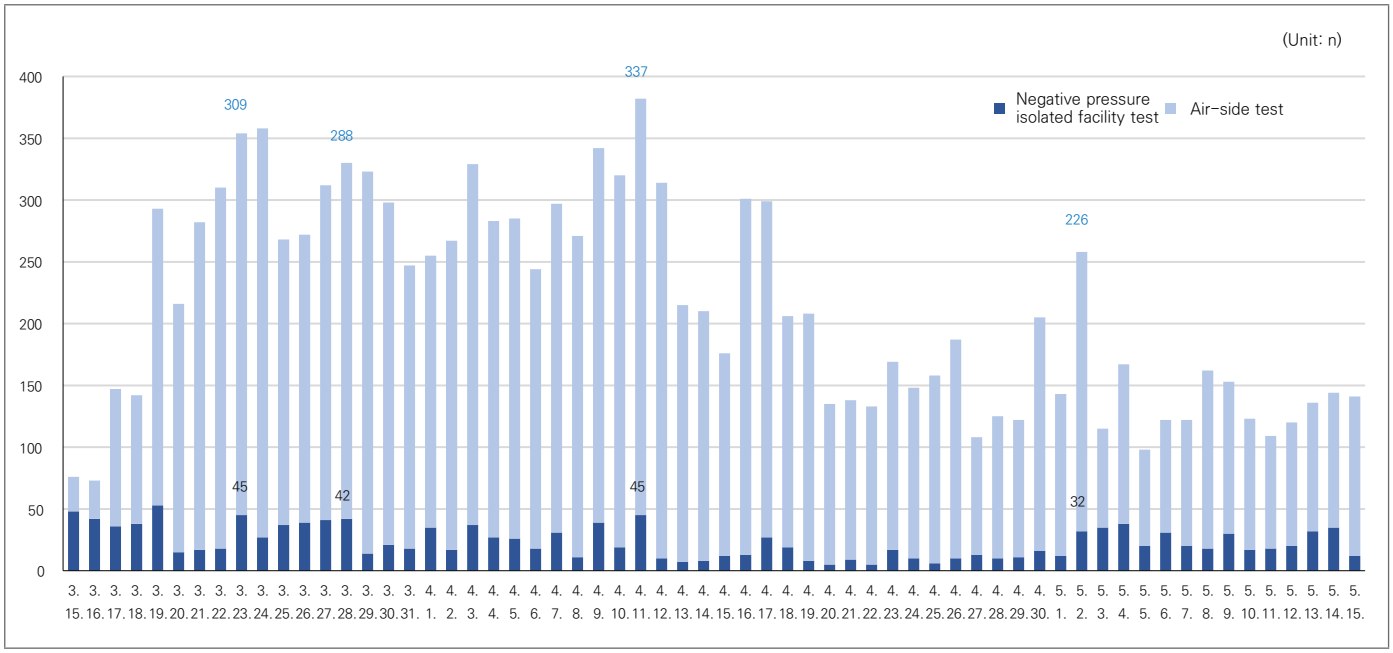

Figure 8. Isolation Types for Patients Under Investigation (PUIs)

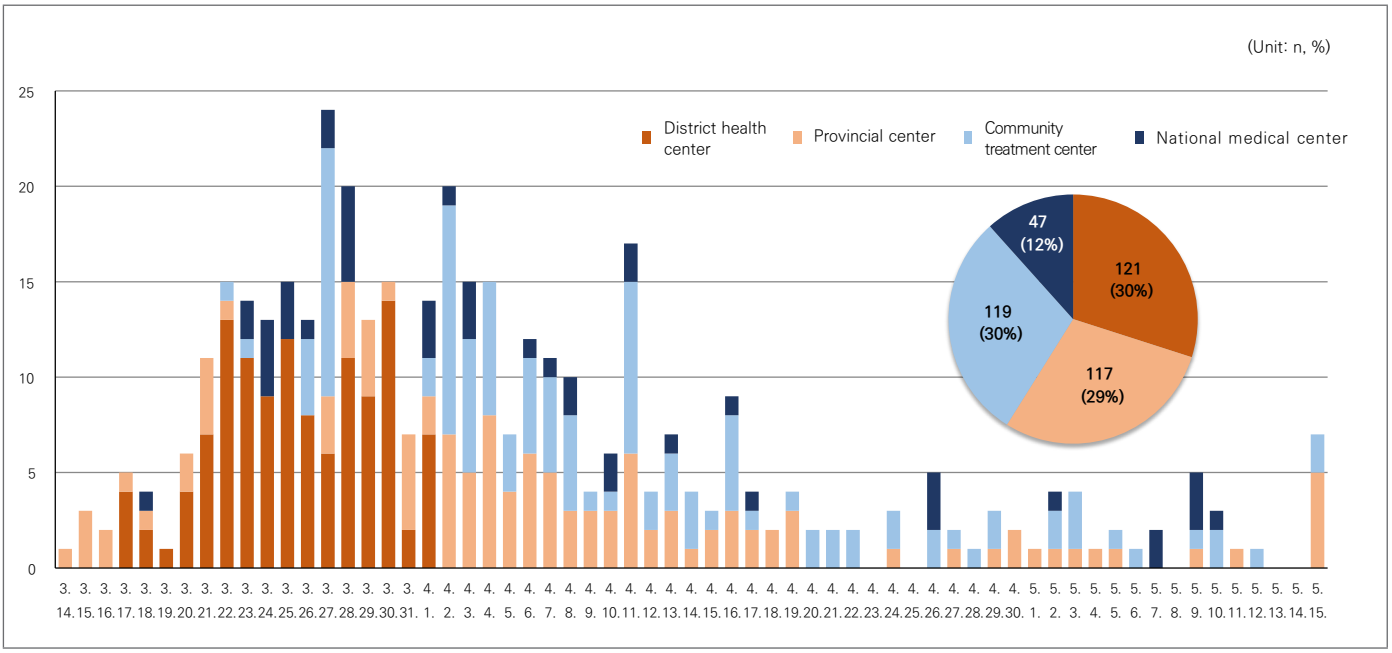

Figure 9. Transfer Types of Confirmed Cases

B. Treating COVID-19 confirmed patients diagnosed during quarantine processing

The processing of a COVID-19 confirmed patient includes procedures for assigning an isolation ward and transportation, and the details vary depending on the patient's severity, residence, and nationality. Any patient suffering from severe symptoms is to be transferred to the National Medical Center. In cases with a mild onset, each confirmed patient is assigned to an isolation facility according to his or her place of residence: if nearby, the patient may be assigned to an institution specializing in infectious diseases within their metropolitan or provincial area, whereas if such institutions are distant from the patient's residence, he or she is assigned to a community treatment center. The treatment of cases identified in quarantine processing at Incheon Airport is presented below (Fig. 9).

In some cases, confirmed patients were transferred to a public health center, as they were directed to return home due to a shortage of temporary waiting areas. However, after sufficient waiting rooms were secured, such cases no longer occurred. Confirmed patients were taken exclusively to the National Medical Center and community treatment centers between March 23 and March 26, before the transfer procedure was established. However, after the government announced the transfer procedure for cases confirmed in quarantine processing, more patients were assigned to isolation wards in their region of residence.

Conclusion

The number of quarantine subjects and PUIs reflected the global trends of the COVID-19 pandemic. The number of PUIs identified in quarantine processing spiked during as the outbreak surged in Europe and the United States, and then stabilized. Recently, we have confirmed an increased influx of patients from the Middle East.

These trends shows that changes in outbreak models in each

country impact the number of PUIs and confirmed cases flowing into South Korea, and implies that an effective quarantine response requires close monitoring and observations of trends in the pandemic overseas. The Incheon Airport National Quarantine Station will continue to monitor outbreak trends abroad and will strive to identify appropriate response measures for the COVID-19 pandemic.

① What was previously known?

Multiple cases of COVID-19 entered into South Korea from abroad after the outbreak of COVID-19 was first reported in late December, 2019.

② What is newly learned?

A total of 405 patients were confirmed to have COVID-19 at the Incheon Airport National Quarantine Station as of May 15, 2020. In particular, the number of cases confirmed during quarantine processing began to spike due to the large-scale spread of COVID-19, which was declared a pandemic in mid-March. Thus, the trends of COVID-19 spread in Europe and the United States were related to the pattern of increasing PUIs and confirmed cases entering South Korea.

③ Implications?

The response to the pandemic in terms of quarantine processing is impacted by outbreak trends in other countries. It is necessary to vigilantly monitor COVID-19 conditions overseas and to reflect these trends by implementing improved quarantine measures.

Reference

1. The 8-1th Edition of COVID-19 Response Guidelines
2. Ministry Health and Welfare, the Quarantine Act (No. 17068) (2020.3).
3. WHO. Coronavirus disease (COVID-2019) situation reports [2020 March 26], Available from: HYPERLINK “https//www.who.int/emergencies/diseases/novel-coronavirus-2019/situation–reports” https://www.who.int/emergencies/diseases/novel-coronav\-irus-2019/situation-reports.
4. WHO, WHO characterizes COVID-19 as a pandemic [2020 May 29], Available from: HYPERLINK “https:www.who.intemergenciesdiseasesnovel-coronavirus-2019events-as-they-happen”

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COVID-19 Special Issue 3

Analysis of COVID-19 Quarantine Results with Adjusted Criteria for Flights from a High-Risk

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Abstract

The purpose of this report was to present the epidemiologic characteristics of Kazakhstan COVID-19 inflow cases in Korea. The Incheon Airport National Quarantine Station saw an increase in the number of imported cases from Kazakhstan and adjusted the COVID-19 diagnostic test standards for passengers from Kazakhstan. The standards for fever changed from 37.5℃ to 37.3℃. As a result, between July 1st and July 10th, 2020, out of 419 passengers from Kazakhstan, 119 passengers were tested with COVID-19 at the quarantine stage, and 28 passengers were confirmed.

The results included 90 cases that were not tested at the quarantine level with conventional COVID-19 test criteria. Using conventional criteria, only 49 cases were classified as Patients Under Investigation (PUI). By adjusting the criteria for COVID-19, the Incheon Airport National Quarantine Station confirmed 15 out of 28 (53.8%) cases at the quarantine stage.

In addition, as a result of analyzing the tympanic temperature at the time of arrival for 61 confirmed cases, including 33 cases that were confirmed after passing through the quarantine stage, 7 cases (11.5%) had body temperatures above 37.5℃ and 17 cases had body temperatures above 37.3℃ (27.8%). The number of confirmed cases was 29 (47.5%) if we included asymptomatic companions of PUIs or persons with body temperatures above 37.3℃.

Keywords: COVID-19, Incheon Airport, Quarantine, Patient under investigation (PUI)

Introduction

Stemming the inflow of coronavirus disease 2019 (COVID-19) from abroad through airport-based screening is an important component of efforts to curb the spread of the disease. The Incheon Airport National Quarantine Station has proactively responded to the pandemic with strengthened screening and quarantine measures for arrivals from Europe, the United States, and Middle Eastern countries since the first case in South Korea was reported on January 20, 2020.

According to an analysis of COVID-19 cases confirmed at the screening clinics of the Incheon Airport National Quarantine Station, most of the imported cases in March and April 2020 were linked to Korean nationals residing overseas, mainly in the United States and Europe. However, the distribution of cases shifted to Middle Eastern workers in May and June 2020, which led to the heightened enforcement of screening/quarantine measures at their places of business in cooperation with major government ministries.

However, amid the recent upsurge in the number of confirmed cases in certain Asian countries, we analyzed the screening results for air travelers from Kazakhstan, who showed

a higher positive test rate than those from other Southwest and Central Asian countries. Herein, we report the results of an analysis of COVID-19 screening for inbound travelers from Kazakhstan from July 1 through July 10, 2020.

Result

The screening clinics of the Incheon Airport National Quarantine Station confirmed six COVID-19 cases on June 22, five on June 24, and 10 on June 29 among passengers of flights from Almaty, Kazakhstan. Based on the epidemiological report on the confirmed cases detailing the current presence/absence of symptoms, the specific symptoms that were involved (fever, respiratory symptoms, etc.), and body temperature, the COVID-19 test requirement criteria for travelers from Kazakhstan were adjusted on July 1.

In this report, we analyzed the screening measures and confirmed cases since the adjustment of the COVID-19 test criteria for direct flights from Kazakhstan from July 1 through July 10. During the period, there were three flights inbound from Kazakhstan (on July 3, 5, and 6), all of which departed from Almaty. The number of passenger seats on each flight was 166.

Symptoms reported on health declaration forms among inbound travelers from Kazakhstan

We reviewed the completed health declaration forms, as a number of passengers on flights from Kazakhstan were found to have a fever upon a temperature check on arrival although they had not reported fever as a symptom. Among Korean nationals, 16 people (14.2%) reported they had symptoms within the last 21 days (3 weeks), whereas only three of the foreign nationals (0.1%) reported symptoms. In particular, among those who did not report any symptoms, two Korean nationals and 26 foreign nationals were identified as having a fever through thermal camera screening and a temperature check, indicating that the foreign nationals tended not to report symptoms on the health declaration form even when symptoms were present. Data on the symptoms reported on the health declaration forms are presented by nationality in Table 1.

Cases subject to diagnostic testing according to the COVID-19 test requirement criteria on flights from Kazakhstan

Due to the multiple instances of inbound travelers from Kazakhstan not reporting symptoms despite the presence of a measurable fever on arrival, the Incheon Airport National Quarantine Station lowered the standard of fever from 37.5°C or higher to 37.3°C or higher for travelers from Kazakhstan. This decision was made in consideration of the fact that flights from Kazakhstan arrive in the morning and the body temperature, which is affected by circadian rhythms, drops during red-

Table 1. Health Declaration Forms (HDFs) Report Status by Nationality

Unit: No. (%)

Nationality	Korean		Foreigner	
	Reported symptoms	Did not report symptoms	Reported symptoms	Did not report symptoms
Report status	16 (14.2)	97 (85.8)	3 (1.0)	303 (99.0)
Total	113		306	

Table 2. The Standards of COVID-19 PUIs and the Standards of COVID-19 Tests from Kazakhstan Flights

Standards of COVID-19 PUIs		Standards of COVID19 test from Kazakhstan flights
Non-contact thermometer measurement		Eardrum thermometer measurement
1. Fever (over 37.5℃)	⇨	1. Fever (over 37.3℃)
2. Symptoms (respiratory, non-respiratory)		2. Symptoms (respiratory, non-respiratory)
		3. Co-Inbound travelers of the patient with fever
		4. Co-Inbound travelers of the respiratory/non-respiratory symptomatic patient

Table 3. The Number of Inbound Travelers and COVID-19 Tests from Kazakhstan Flights

Unit: No., %

Date	No. of Inbound travelers			No. of Incheon Airport COVID-19 tests	Test ratio compared to Inbound travelers
	Total	Koreans	Foreigners (Kazakhstan)		
July 3, 2020	118	38	80 (66)	36	30.5
July 5, 2020	144	32	112 (100)	51	35.4
July 6, 2020	157	43	114 (100)	32	20.4
Total	**419**	**113**	**306 (266)**	**119**	**28.8**

eye flights. Instead of a contactless thermometer, a tympanic membrane thermometer was used to measure the core body temperature [2,3].

Furthermore, considering the characteristic of COVID-19 that it easily spreads among multiple individuals who are in close contact for extended periods of time, such as family members and acquaintances [4], COVID-19 tests were also administered to asymptomatic family members or travel companions of a person with a fever (37.3°C or higher) or symptoms (respiratory or non-respiratory). Table 2 compares the previous and current COVID-19 test criteria for air travelers from Kazakhstan.

During the period of analysis, the number of inbound travelers on the three flights from Kazakhstan increased gradually, from 118 on July 3 (38 Korean nationals and 80 foreign nationals) to 144 on July 5 (32 Korean nationals and 112 foreign nationals) and 157 on July 6 (43 Korean nationals and 114 foreign nationals). In particular, the number of Kazakh nationals on the respective flights was 66, 100, and 100, indicating that most of the passengers were Kazakh.

After the adjustment of the diagnostic test requirement criteria by the Incheon Airport National Quarantine Station, the number of incoming travelers who were subject to a COVID-19 test increased, compared to when the traditional criteria for persons suspected of COVID-19 (patients under investigation [PUIs] exhibiting a body temperature of 37.5°C or over or other symptoms of COVID-19) were used.1 Therefore, the mean proportion of total passengers who received COVID-19 tests among the total passengers was 28.8%, higher than the average ratio from April to July (4.37%; 3.65% when transit passengers were included). The number of inbound travelers from Kazakhstan and the number of those tested for COVID-19 are presented in Table 3.

Table 4. The Number of COVID-19 Tests According to the Standards

(Confirmed cases) Unit: No.

Date	No. of Incheon Airport COVID-19 tests	Conventional COVID-19 PUIs	Standard adjustment	
			Temperature 37.3~37.4℃	Co-Inbound travelers of symptomatic patients
July 3, 2020	36 (12)	15 (6)	8 (3)	13 (3)
July 5, 2020	51 (9)	22 (4)	14 (3)	15 (2)
July 6, 2020	32 (7)	10 (3)	9 (2)	13 (2)
Total	**119 (28)**	**49 (13)**	**31 (8)**	**59 (7)**

Cases tested and confirmed during the airport screening process according to COVID-19 test requirements for flights from Kazakhstan

Table 4 compares the number of people who were tested for COVID-19 during the airport screening process among all passengers on flights from Kazakhstan. When the traditional diagnostic test criteria were applied, the number of people classified as PUIs was 15 on July 3, 22 on July 5, and 10 on July 6, accounting for 14.5% of the total passengers. However, the adjusted criteria additionally required diagnostic testing for 21 people on July 3, 29 on July 5, and 22 on July 6, which brought

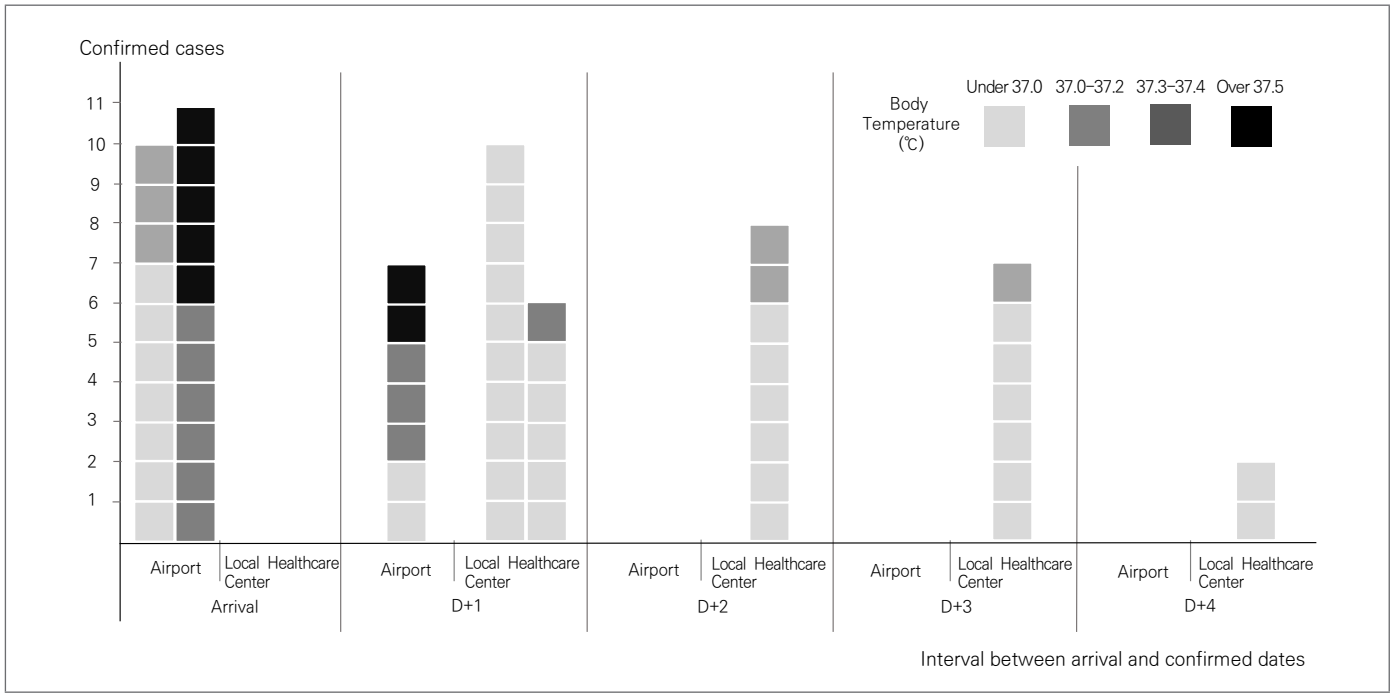

Figure 1. The Distribution of Body Temperature in COVID-19 Patients with the Interval of Arrival and Confirmed Dates

the total number of passengers tested for COVID-19 to 36 on July 3, 51 on July 5, and 32 on July 6.

Twenty-eight patients were finally confirmed to have COVID-19 by diagnostic testing conducted at the screening clinics of the Incheon Airport National Quarantine Station. Thirteen of the confirmed patients (46.4%) had been classified as PUIs according to the initial criteria. The remaining 15 patients had been required to undergo testing after adjustment of the test criteria: eight people (28.6%) had a body temperature of 37.3–37.4°C and seven asymptomatic people (25.0%) were in travel groups containing a symptomatic individual.

Body temperature on arrival and duration from the date of entry to confirmation of COVID-19 among confirmed cases

Figure 1 shows the distribution of body temperature on arrival and the interval from the time of entry to the confirmation of COVID-19 at a screening clinic during the airport screening process or at a local healthcare center among those who entered the country on these three flights.

For the cases tested during the airport screening process, the infection was confirmed on the day of entry or the day after arrival; for cases tested at local healthcare centers, there were no confirmed cases on the day of entry, and there was 1–4 days of delay until confirmation. This discrepancy seems to have been due to differences in the timing of tests determined by local governments, as the COVID-19 response guidelines require overseas entrants to be tested within 3 days of arrival.

Seven of the 61 confirmed patients (11.5%) were individuals who had been classified as PUIs according to the traditional criterion of a body temperature of 37.5°C or over, all of whom tested positive at the Incheon Airport screening clinic. Seventeen patients (27.9%) were additionally tested according to the new criterion of a body temperature of 37. 3°C or over3) and 12 patients were additionally tested because they were traveling together with symptomatic individuals, which brought the total number of people tested according to the new criteria to 29 (47.5%). The latter 12 people were all asymptomatic, with a body temperature less than 37.3°C, and were confirmed during airport screening. Therefore, it was confirmed that if the rate of reporting of symptoms on health declaration forms is low in a pandemic situation, adjusting the standards regarding the definition of a fever and other epidemiological characteristics for travelers from high-risk countries alone can be an effective measure during airport screening to prevent the spread of a disease.

Conclusions

The Incheon Airport National Quarantine Station has implemented enhanced COVID-19 screening procedures since January 2, 2020. In response to the pandemic, it has been striving to prevent the inflow of COVID-19 from overseas and has responded adaptively by analyzing the epidemiological characteristics and risk profile of inbound travelers. This report has confirmed that in a pandemic situation, a history of travel to high-risk countries and nationality, rather than the presence of symptoms, could be a crucial factor in the screening process and adjusting diagnostic test criteria (fever and the classification of accompanying travelers given the risk of intrafamilial transmission of COVID-19) could be an effective measure to tackle the pandemic. The Incheon Airport National Quarantine Station will continue to monitor outbreaks overseas and the epidemiological characteristics of incoming travelers to actively respond to imported cases of the disease.

① What was previously known?

Since the outbreak of COVID-19 was first reported at the end of December 2019, a steady influx of imported cases has been identified. Thus, the Incheon Airport National Quarantine Station has implemented enhanced screening/quarantine measures.

② What is newly added?

It was confirmed that the proportion of foreign nationals who reported symptoms on the health declaration form was low. Under the circumstances, it was found that adjusting the diagnostic test requirement criteria regarding fever and travel companions was effective for preventing the inflow of COVID-19 from abroad.

③ Implications?

COVID-19 response measures taken during the airport screening process are affected by the status of the outbreak in other countries and international relations. It is advised to strengthen screening measures appropriately by regularly monitoring the international status of the COVID-19 pandemic.

Reference

1. Response Guidelines for the Quarantine of COVID-19 (9th Edition)
2. Hye-Geum Kim, Wan Seok Seo. Sleep and Temperature. Sleep Medicine and Psychophysiology. 2016;23(2):47-52.
3. Hyunah Lee, Chul-Hyun Cho, Leen Kim. Human Circadian Rhythms. Sleep Medicine and Psychophysiology. 2014;21(2):51-60.
4. Junghee Hyun, Jung Hyun Lee, Youngjoon Park, Eun Kyeong Jung. Interim Epidemiological and clinical characteristic of COVID-19 28 cases in South Korea. Public Health Weekly Report. 2020;13(9):464-474.
5. Jiyun Park, Dongyoung Kim, Gihoon Kwon, Hansuk Kim. Response to the COVID-19 National Quarantine Station in Incheon Airport. Public Health Weekly Report. 2020;13(23):1627-1642.

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정책 & 가이드

코로나바이러스감염증-19 대응지침(지자체용) 9-1판 소개

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초 록

전 세계에 빠른 속도로 코로나19가 확산되면서, 각국에서는 코로나19 예방 및 전파 차단을 위한 다양한 정책과 함께 관리를 위한 가이드라인을 지속적으로 개정하여 배포하고 있다. 우리나라도 환자발생 추이 및 관련 정책변화, 문헌에 따른 과학적 근거자료들을 바탕으로 지속적으로 지침을 개정하였다. 가장 큰 개정사항은 사례 정의 부분으로서 전 세계로 코로나19가 확산됨에 따라 중국 화난 해산물 시장방문력 → 후베이성 방문력 → 중국 방문력 → 국외 여행력으로 점차 확대되었다. 또한 초기 진단을 위한 임상증상도 지속적으로 변경되었고, 코로나19 확산에 따른 격리해제기준도 변경되었다.

지침에는 크게 코로나19 유행을 관리하기 위한 국가 대응체계, 사례정의 및 감염병의심자 정의, 감염병환자 신고·보고 체계, 해외입국자 관리, 역학조사, 환자, 의사환자 및 조사대상유증상자 발생 시 대응방안, 사망자 관리, 실험실관리, 환경관리 및 자원관리 등의 내용이 포함되어 있다. 관련 부록과 질의 및 응답을 통해 일선 현장에서 코로나19를 대응할 때 유용한 정보를 제공하고자 하였다.

아직까지 바이러스에 대한 정확한 정보가 밝혀지지 않았으며 효과적인 백신이나 치료제가 없어 지속적인 관리와 대응준비가 필요하다. 우리나라의 코로나19 대응지침은 그간의 정책방향, 자원비축현황, 국내외 연구현황 및 가이드라인 등에 맞추어 신속하게 변경되었으며, 앞으로도 국가 정책방향을 담아 개정해 나갈 계획이다.

주요 검색어 : 코로나19, 대응지침

들어가는 말

2019년 12월 중국 우한시에서 원인미상 폐렴 환자 발생이후, 중국에서 1월 7일 새로운 바이러스 타입의 코로나바이러스가 분리되어 신종코로나바이러스 출현이 확인되었다. 1월 13일 태국을 시작으로 일본, 우리나라 등 중국 이외 국가에서 해외유입에 의한 신종코로나바이러스 환자 발생이 확인되었고, 1월 30일에 WHO에서는 국제적 공중보건 비상상태를 선포하였다. 세계보건기구(WHO)에서 1월 11일 중국 우한에서 발생한 신종코로나바이러스감염증은 COVID-19로 명명하였고, 국제바이러스 분류학 위원회에서 SARS-CoV-2로 바이러스 명칭을 도입하였다. 우리나라는 2월 12일부터 코로나바이러스감염증-19(코로나19)로 명명하기로 하였다. 다른 국가에서 코로나19가 급속히 확산되면서 3월 11일에 WHO는 세계적 대유행 "판데믹"을 선언하였고, 7월 27일 9시(한국시간) 현재 216개 국가 및 지역에서 16,114,449명이 발생하였고 사망자도 646,641명이 보고되었다(WHO 홈페이지).

우리나라는 2020년 1월 20일 첫 환자 발생이후, 발생이 확산되어 2월 23일에 감염병 위기 경보를 "심각" 단계로 상향하고 사회적 거리두기를 시작하였으며, 7월 28일 0시 현재 14,203명이 발생하였고 300명이 사망하였다. 현재까지도 지역사회에서 산발적인 발생이 지속되고 있다.

질병관리본부는 중국 우한시 원인불명 폐렴 집단발생을 인지한 1월4일에 「중국 우한시 원인불명 폐렴 대응절차 안내문(지자체용)」을

배포하였으며, 환자발생 추이 및 관련 정책변화, 국외 관리현황 변화에 따라 지속적으로 지침을 개정하였다.

이에 그간 지침의 주요 변경사항과 「코로나19 대응지침(9-1판)(지자체용)」 주요 내용을 소개하고자 한다.

몸 말

1. 그간 지침의 주요 제·개정경과

지침 1판(1.4.)에서 4판(1.28)까지는 신고 및 대응을 위한 사례정의가 주요 내용으로 계속 변화하는 역학적 정보에 따라 사례정의를 변경하였다. 의사환자 및 조사대상유증상자의 역학적 연관성은 처음에 중국 화난 해상물 시장 방문력에서 우한시 방문력, 후베이성 및 중국 방문력으로 점차 확대되었다.

우리나라 감염병위기 경보 '경계'로 상향 및 WHO 국제 공중보건 비상상태 선포 이후, 지침 5판(2.6.)에서는 환자 검사 및 격리 조치 및 해제, 접촉자 조사 등 안내사항이 추가되었다.

6판(2.19.)에서는 사례정의에 환자 조기 발견을 위해 조사대상 유증상자를 추가하여 진단검사 대상자를 확대하고 입원이 필요한 환자 기준을 제시하고, 방역 및 소독 명령에 대한 근거를 구체적으로 명시하였다.

7판(3.2.)에서는 2월 23일에 위기경보 심각단계로 상향 이후, 역학조사, 격리해제 및 격리기간을 구체적으로 명시하고, 확진자 관리 강화를 위한 원칙과 사망자 발생 시 처리원칙이 추가되었다. 7-1판(3.6.)에서는 격리해제기준이 변경되어 무증상 확진자의 경우 검사기준 없이 임상기준 호전 시 확진일로부터 3주간 격리해제 기준이 포함되었다. 7-2판(3.12.)에서는 집단시설 격리 범위 및 방법(공동격리) 기준 및 조치사항이 추가 되었고, 7-3판(3.15.)에서는 검사 없이 임상기준 호전 시 격리해제 기준이 삭제되었고, 확진자 접촉자 해제 전 검사 범위에 동거인(동거가족 포함)을 포함하도록 하였다. 7-4판(4.2.)에서는 대상자 모니터링 방법에 모바일 자가관리앱이 추가되었고, 검역단계 조사대상 유증상자 관리방법이 추가되었다. 접촉자 기준이 환자 증상발생 1일전에서 2일전으로 확대되고 해외입국자 관리방안 강화내용이 추가되었다.

8판(5.11.)에서는 임상증상의 범위가 미각 및 후각 소실 등이 포함되어 확대되었고, 지역사회 유행 시 감시 강화, 확진자 접촉자 해제 전 검사 범위가 동거가족, 의료인 등에서 사회복지 생활시설 입소자와 종사자, 학생 및 교직원까지 포함하도록 확대되었다.

표 1. 사례정의 주요 변경사항(1판~4판)

구분	의사환자	조사대상유증상자
1판 (1.4.)	· 증상발생 14일 전 **중국 화난 해산물 시장** 방문력 · **발열**, 중증 **호흡기증상**(폐렴 등)	· 증상발생 14일 전 **중국 화난 해산물 시장** 방문력 + **발열, 호흡기증상**(기침, 호흡곤란 등) · 증상발생 14일 전 **중국 우한시** 방문력 + **발열, 중증 호흡기증상**(폐렴 등)
2판 (1.8.)	· 증상발생 14일 전 **중국 화난 해산물 시장** 방문력 · **폐렴 또는 폐렴의심증상**(발열 동반 호흡곤란 등)	· 증상발생 14일 전 **중국 화난 해산물 시장** 방문력 + **발열, 호흡기증상**(기침 등) · 증상발생 14일 전 **중국 우한시** 방문력 + **폐렴 또는 폐렴의심증상**(발열 동반 호흡곤란 등)
3판 (1.17.)	· 증상발생 14일 전 **중국 우한시** 방문력 또는 확진자 유증상기간 **밀접접촉력** · **발열, 호흡기증상**(기침 등), **폐렴의심증상**(발열 동반 호흡곤란 등), **폐렴**	· 증상발생 14일 전 **중국 우한시** 방문력 + **발열, 호흡기증상**(기침 등)
4판 (1.27.)	· 증상발생 14일 전 **중국 후베이성 방문력** 또는 확진자 유증상 기간 밀접 접촉력 · **발열, 호흡기증상**(기침, 인후통 등)	· 증상발생 14일 전 **중국** 방문력 + **폐렴**

표 2. 사례정의 주요 변경사항(5판~8판)

구분	의사환자	조사대상유증상자
5판 (2.6.)	· 증상발생 14일 전 **중국** 방문력 또는 확진자 밀접 접촉력 + **발열, 호흡기증상**(기침, 인후통 등) · 의사소견에 따른 의심자	-
6판 (2.19.)	· 증상발생 14일 전 **중국(홍콩, 마카오 포함)** 방문력 또는 확진자 접촉력 + **발열, 호흡기증상**(기침, 인후통 등) · 의사소견에 따른 입원이 필요한 원인미상 폐렴	· 코로나19 발생국가 방문 14일 후 **발열, 호흡기증상**(기침 등) · 의사소견에 따른 의심자
7판 (3.2.)	· 확진자 유증상기간 **접촉력 + 14일 이내 발열, 호흡기증상**(기침 등)	· 의사소견에 따른 원인미상 폐렴 등 의심자 · 중국(홍콩, 마카오 포함) 등 코로나19 지역 전파국가 방문 후 발열 또는 호흡기 증상자 · 국내 집단발생 관련 역학적 연관성과 14일 이내 발열 또는 호흡기 증상자
8판 (5.11.)	· **확진자 접촉후 14일이내 코로나19 유증상자** · 주요증상 : 발열, 기침, 호흡곤란, 오한, 근육통, 두통, 인후통, 후각 및 미각소실 또는 폐렴 등	· 의사소견에 따른 코로나19 유증상 의심자 · 해외방문 후 14일이내 코로나19 유증상자 · 국내 집단발생 관련 역학적 연관성과 14일 이내 코로나19 유증상자

9판(6.25.)에서는 격리해제 시 기존 검사기반 이외 임상경과에 따른 격리해제 기준을 추가하였고, 환자 증가에 대비한 원활한 병상수급을 위해 전원기준에 대한 절차를 보완하였다. 또한, 확진자 접촉자 해제 전 검사대상자에 만 65세 이상을 추가하고, 격리 시 소아나 거동이 불편한 자, 정신질환자 등에 대한 보호자 동반 가능한 조항을 신설하였다.

2. 주요내용

질병관리본부는 코로나19를 '제1급감염병 신종감염병증후군'을 적용하여 대응하고 있으며, 그간 알려진 관련 국·내외 문헌이나 가이드라인, 국내외 역학자료, 정책방향에 따른 대응 절차 등을 관련 학계 및 단체 전문가들의 자문을 받고 협의를 거쳐 개정하고 있다.

현재 코로나19 대응지침 9-1판의 주요 내용은 다음과 같다.

가. 대응체계

법적 근거에 따라 환자 조기 발견, 신속한 역학조사, 환자 및 접촉자 관리 등을 통한 감염병 확산방지를 위해 감염병 위기단계 "심각" 단계에 따라 중앙재난안전대책본부(국무총리), 중앙사고수습본부(보건복지부), 중앙방역대책본부(질병관리본부), 범정부지원본부(행정안전부) 등의 중앙 조직을 갖추고 기관별 임무를 수행하고 있으며, 지자체에도 환자 발생에 대비한 즉각대응팀과 환자관리반 등을 구성하여 상황을 평가하고, 역학조사 및 현장통제, 지역 내 의료 인력이나 자원관리 등의 역할을 수행하도록 하고 있다.

나. 사례 및 감염병의심자 정의

국내 확진자 발생, 역학조사결과 및 유행 수준에 따라 사례정의를 기술하고 있으며, 법률에 따른 감염병의심자의 정의도 포함되었다.

확진자는 임상양상에 관계없이 검사기준에 따라 감염병 병원체 감염이 확인된 자, 의사환자는 확진자와 접촉한 후 14일 이내에 코로나19 임상증상이 나타난 자, 조사대상유증상자는 의사소견, 해외 방문력, 국내 집단발생과 역학적 연관성을 고려하여 코로나19 임상증상이 나타난 자로 정의하고 있다. 주요 임상증상은 발열, 기침, 호흡곤란뿐만 아니라 오한, 근육통, 인후통, 후각 및 미각 소실, 폐렴 등으로 정의하고 있다. 감염병의심자는 환자, 의사환자, 병원체 보유자(이하 "감염병환자등")와 접촉하였거나 접촉이 의심되는

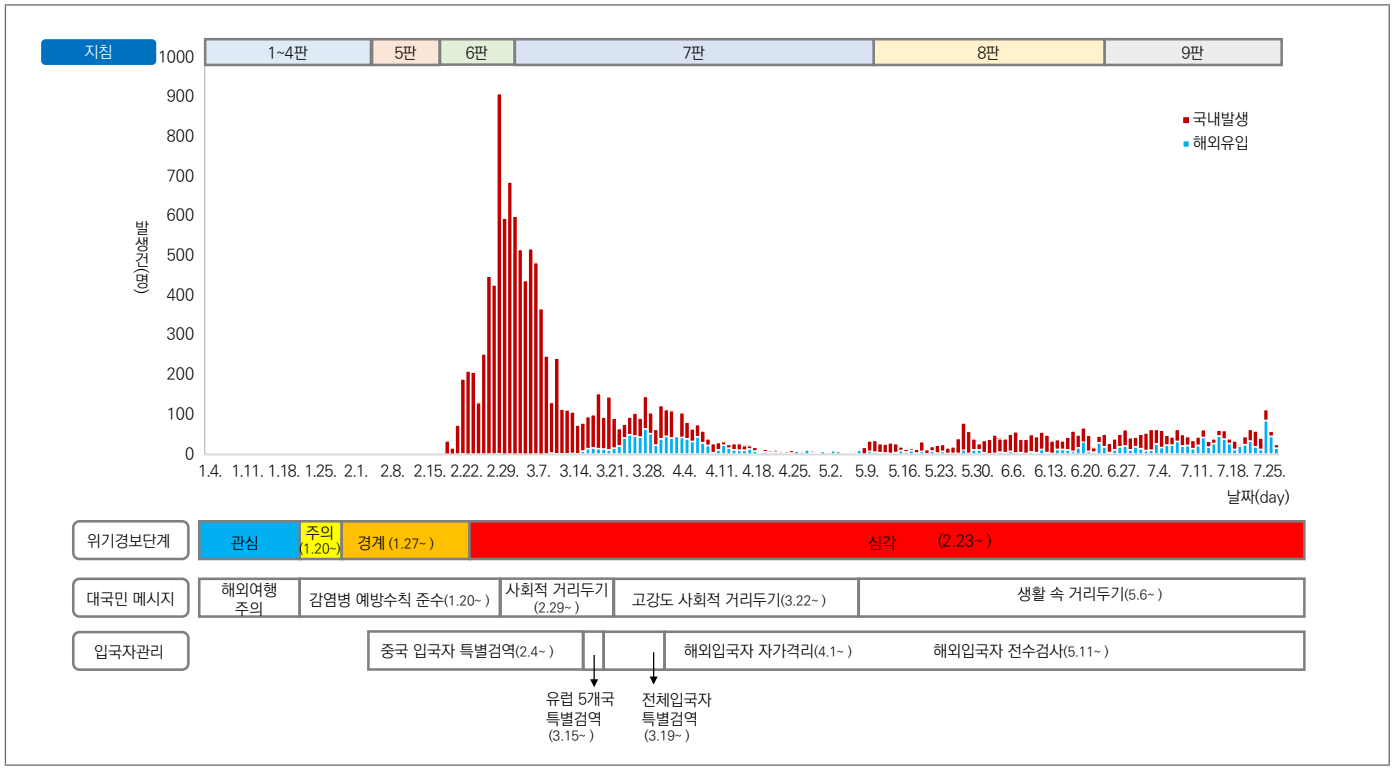

그림 1. 코로나바이러스감염증-19(COVID-19) 국내 발생현황(~7.27, 2020)

사람이나 검역법에 의한 관리지역을 체류·경유하였거나 위험요인에 노출되어 감염이 우려되는 사람으로 정의하고 있다.

다. 감염병환자 신고·보고 체계

법률에 따라 감염병환자등을 최초로 인지한 의료기관에서 환자의 사례정의 기준(검사결과, 확진자 접촉력, 임상증상, 역학적 연관성 등)을 바탕으로 질병보건통합관리시스템을 통해 신고하도록 하고 있다. 최초 신고 자료에는 감염병환자의 인적정보, 발병일, 검사일, 입원유무 등에 대한 감염병 발생정보, 신고의료기관 현황 및 보건소에서 추가로 확인된 추정감염지역 등의 정보가 포함되어 있다. 현재 법률에 포함되어 있지 않은 조사대상유증상자 또한 현행 시스템을 통해 신고된 자료로 현황을 확인하고 있다.

라. 해외입국자 관리

유럽, 미국 등 전 세계에 코로나19 발생이 증가하면서 입국자에 대한 관리강화 필요성이 증가함에 따라 입국 단계에서는 발열감시 및 건강상태 질문서를 제출받아 유증상자와 무증상자에 대한 조치를 수행한다. 유증상자는 검역소에서 임시격리하며 진단검사를 실시하고 무증상자 및 검사 음성자는 모바일 모니터링 앱을 설치하고 자가 또는 시설에서 14일간 격리한다. 모든 입국자는 입국 후 3일 이내 진단검사를 실시하도록 한다.

마. 역학조사

감염병예방법에 따라 대상자에게 사전 고지를 실시하고 확진자 최초 인지 보건소가 시도 즉각대응팀의 지휘를 받아 접촉자 조사를 실시하도록 한다. 확진자의 가족 및 동거인 등 접촉자는 우선 자가격리 조치를 시행하며, 의료기관 또는 집단시설 등에서의 노출력이 있는 경우 노출상황평가를 실시하며, 필요시 방역관은 확진자 세부 동선 파악, 접촉자 일제검사 계획 마련 등 시행

가능하도록 규정하고 있다. 의료기관 또는 집단시설 역학조사 시에는 시·도방역관 또는 역학조사관이 환자 증상 발생 14일 전 활동력 등을 조사하고 위험도 평가를 통한 시설 일시 폐쇄 또는 소독 관리, 접촉자 조사 및 분류, 접촉자 관리 및 모니터링 방안 등을 마련하도록 하고 있다.

바. 환자, 의사환자 및 조사대상유증상자 발생 시 대응방안

주요 관리방안으로 대상자 모니터링, 격리 및 입원치료, 격리해제 및 격리해제 후 PCR 재검출시 조치사항 등이 포함되어 있다.

– 의사환자는 검사를 실시하여 검사결과 음성이더라도 환자와 접촉일로부터 14일간 격리를 유지한다.

– 조사대상유증상자는 선별진료소에서 수진자 자격조회 등 시스템을 통해 해외 방문력을 확인하고, 문진을 통해 국내외 여행 및 확진자 접촉력, 임상증상 등을 파악하여 진료 및 검사를 시행한다.

– 확진자가 병원치료가 필요한 경우 중증도 분류와 병상배정 현황을 파악하고 입원치료를 시행하며, 병원치료가 필요하지 않거나 입원환자 중 퇴원기준에 부합한 경우 생활치료센터 시설에서 치료를 실시한다. 시설에서는 담당 의료진이 매일 2회 증상 모니터링을 실시한다.

9판부터는 확진자의 격리해제 시 기존의 검사 기반 기준뿐 아니라 임상경과 기반 기준이 도입되어, 의사의 판단에 따라 임상경과 또는 검사결과 중 한 가지를 충족하는 경우 격리해제가 가능하다.

– 환자의 상태에 따라 의료진이 전원/전실/생활치료센터의 입소를 결정한 경우에는 입원치료통지서를 재발급하고, 환자가 이를 거부하면 입원치료 통지서 재발급 받은 날의 익일부터 발생하는 본인부담금 및 필수 비급여에 대한 비용은 격리입원치료비로 지원하지 않으며 환자가 부담해야 한다.

– 확진자의 접촉자는 코로나19 임상증상이 발생하지 않으면 자가격리를 시행하고, 확진자와의 최종 접촉일로부터 14일이 경과하면 격리를 해제한다. 초기 검사결과가 음성이어도 기존 자가격리 및 능동감시는 14일간 지속된다. 다만 접촉자 격리해제 전 의료기관 종사자, 사회복지 생활시설 입소자 및 종사자, 학생 및 교직원, 확진자의 동거인, 만65세 이상은 13일째 검사하여 음성임을 확인한 후 만 14일이 경과한 날 정오에 격리해제한다.

표 3. 확진자의 격리해제 기준 변경

8-1판		9판
【무증상자】 ① 확진 후 7일째 PCR 검사결과 24시간 이상 간격 연속 2회 음성 ② 확진 후 7일째 PCR 검사결과 양성이면, 이후 7일 후 검사(확진일로부터 14일째) → 양성시 이후 검사주기는 의료진 결정 → 24시간 이상의 간격연속 2회 음성	⇨	【무증상자】 한 가지 기준 충족 ① (임상경과 기준) 확진 후 10일 경과, 그리고 이 기간 동안 임상증상이 발생하지 않음 ② (검사 기준) 확진 후 7일 경과, 그리고 그 후 PCR 검사 결과 24시간 이상의 간격 연속 2회 음성
【유증상자】 발병 후 7일이 경과한 자로, 1) 해열제 복용하지 않고 발열이 없으며 임상증상 호전되고, 그리고 2) PCR 검사결과 24시간 이상 간격 연속 2회 음성	⇨	【유증상자】 한 가지 기준 충족 ① (임상경과 기준) 발병 후 10일 경과, 그리고 그 후 최소 72시간 동안 1) 해열제 복용없이 발열이 없고, 2) 임상증상이 호전되는 추세 ② (검사 기준) 발병 후 7일 경과, 그리고 해열제 복용 없이 발열이 없고 임상증상이 호전되는 추세, 그리고 그 후 PCR 검사 결과 24시간 이상의 간격으로 연속 2회 음성

사. 사망자 관리

감염 확산 방지 등을 위해 코로나19로 확인된 사망자의 신속하고 원활한 시신 처리 및 장례 지원 등을 안내한다. 코로나19로 인한 사망자는 화장을 원칙으로 하며, 유족과 협의하여 시신처리 및 입관을 지원하도록 한다. 감염병예방법에 따라 장사방법이 제한된 사망자의 장사비용은 관할 지자체에서 지급한다.

아. 실험실 검사 관리

확인진단을 위한 검체 채취는 선별진료소 또는 의료기관 내 다른 공간과 격리된 검체 채취공간에서 실시하도록 하며, 상기도 검체를 채취하고 만일 기침이나 가래가 있는 경우 하기도 검체도 채취한다. 채취한 검체는 바이러스 수송용 배지에 담아 검체시험의뢰서와 함께 수탁검사기관으로 의뢰한다. 검사결과는 의뢰한 기관으로 통보하며, 검사결과를 통보받은 의료기관은 감염병시스템에 결과를 입력·보고한다.

자. 환경관리

집단시설·다중이용시설이나 환자이용(거주) 공간에 대한 신속하고 올바른 소독을 시행하도록 안내하며, 환경부에서 승인·신고된 환경소독제를 선택하고 제품별 사용량, 사용방법, 주의사항 등을 준수하도록 안내한다. 올바른 소독방법은 공기 중의 오염원이 외부로 배출될 수 있도록 충분히 환기를 시킨 후, 소독제로 천을 적셔서 손길이 닿는 벽면과 자주 사용하는 모든 부위를 닦고 일정시간 이상 유지 후, 깨끗한 물로 적신 천으로 표면을 닦는 것이다. 소독제를 분사하는 소독방법은 감염원 에어로졸 발생 흡입 위험을 증가시키고 접촉범위가 불분명하여 권장하지 않는다. 소독을 할 때는 주의사항에 따라 개인보호구를 철저히 착용하고 소독장소는 충분히 환기하도록 하며, 소독제의 종류에 따라 시설 사용재개 기준을 결정하도록 권고한다.

차. 자원관리

환자 발생 시 환자 중증도 및 기저질환 등 고위험군 여부를 파악하여 지자체 상황에 따라 병상 배정 관리를 추진하도록 한다. 시도 환자관리반은 공공병원, 민간병원에서의 음압병실, 1인실, 중환자 치료를 위한 장비, 인력현황 등을 파악하고 중증도 분류에 따라 고위험군을 우선적으로 병상 배정하여 치료하도록 자원을 관리한다.

그리고 관련 부록과 질의 및 응답(FAQ)을 통해 일선 현장에서 코로나19를 대응할 때 유용한 정보를 제공한다.

맺는 말

코로나19는 2009년 발생한 신종인플루엔자, 2015년 메르스에 이어 21세기 발생한 대유행 감염병이다. 아직까지 바이러스에 대한 정확한 정보가 밝혀지지 않았으나 전 세계 수많은 국가에서 발생자가 지속적으로 나타나고 있고 고연령층에서 치명률이 높아 국가 감염병 위기사태를 초래할 만큼 위협적인 상황이 되었다. 현재 각 국가에서는 점차 해외유입에 대한 봉쇄전략을 해제하고 있어 다시 교류가 확대되면 재유행의 가능성이 높다고 전문가들은 전망하고 있다. 하지만 현재까지는 효과적인 백신이나 치료제가 없고 아직 개발단계이며 항체 형성 효과도 매우 낮은 것으로 보고되고 있어 우려가 지속되고 있다.

우리나라에서도 3월 22일 고강도 사회적 거리두기 이후 5월 6일 생활 속 거리두기로 강도를 낮추었으나 소규모 집단 발생 및 지역사회 감염이 지속적으로 발생하고 있고, 무증상 감염자에 의한 전파 및 확산이 우려되고 있다. 메르스 이후 신속한 검사체계, 대응대비 계획, 의료자원 비축, 모의훈련 등을 통한 적극적인 준비에도 불구하고 감염병의 특성이 명확하지 않은 신종 감염병에 대한 대비는 한계가 있으며, 포스트 코로나를 대비한 좀 더 촘촘한 대응 체계 준비가 필요하다.

현재까지의 방역의 효과적인 관리는 다부처의 협력과 의료진의 헌신, 지자체 담당 공무원의 노력, 그리고 대국민의 선진적인 국민의식을 통해서 이루어졌으나, 아직 진행 중인 대유행 감염병의 관리를 위해서는 전 세계 모두의 노력이 요구된다. 우리나라의 코로나19 대응지침은 그간의 정책방향, 자원비축현황, 국내외 연구현황 및 가이드라인 등에 맞추어 신속하게 변경되었으며, 앞으로도 SARS-Cov-2 바이러스 특성, 코로나19의 역학적 특성 등이 업데이트되고 백신이나 치료제 개발이 되는 등 환경 변화에 맞추어 신속하고 근거기반으로 지속적으로 개정해 나갈 계획이다.

① 이전에 알려진 내용은?

코로나19 발생이 중국 후베이성 화난 해산물시장에서 점차 확산되어 세계적 대유행 "판데믹" 상황이며, 지속적으로 발생되고 있다.

② 새로이 알게 된 내용은?

세계적인 환자 발생 상황에 따라 우리나라 정책이 변경되었으며 자원비축현황, 국내외 연구현황 등에 따른 지침을 개정하여 적용하였으며, 시기별로 주요 변경된 사항을 확인할 수 있다.

③ 시사점은?

우리나라의 코로나19 대응지침은 시의성 있게 코로나19에 대응하도록 개정하였으며, 여러 국가에서 번역하여 활용할 만큼 유용하게 활용되고 있다.

참고문헌

1. 세계보건기구(www.who.int)
2. 미국 질병관리통제센터(www.cdc.gov)
3. 유럽 질병예방통제센터(www.ecdc.gov)
4. 영국의학저널(www.bmj.com)
5. www.thelancet.com
6. 싱가폴 보건부(www.moh.gov.sg)
7. 중국 질병관리통제센터(www.chinacdc.cn)
8. 일본 후생성(www.mhlw.go.jp)
9. 대만 보건부(www.mohw.gov.tw)
10. 홍콩 보건부(www.chp.gov.hk)
11. 영국 보건부(www.gov.uk)
12. 호주 보건부(www.health.gov.au)

Abstract

Introduction of the 9-1th Edition of COVID-19 Response Guidelines

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Due to the rapid global spread of coronavirus disease 2019(COVID-19), many countries adopted various strategies and developed interim guidelines to reduce the transmission of severe acute respiratory syndrome coronavirus 2(SARS-CoV-2), the strain of coronavirus that cause COVID-19. Likewise, Korea revised its guidelines based on trend in patient outbreaks, related policy changes, resource storage status, and scientific evidence. However, SARS-CoV-2 is a new strain of coronavirus that had not been previously identified in humans. Accurate information about the virus was unavailable, and no effective vaccine or treatment, so continuous management and response preparation were necessary.

This article presented the interim set of guidelines for staff at local and state health departments based on what was known about COVID-10. One major revision was the case definition, which was formulated on current available information and revised as new information was gathered. For example, COVID-19's timeline and spread was traced from the Huanan seafood market to the province of Hubei to mainland China and finally, to nations outside of China.

The guidelines included response systems for COVID-19 control, case definitions, reporting systems for COVID-19 cases, epidemiological investigations, response management for patients under investigation (PUI), and for confirmed and suspected cases, as well as death, laboratory, environmental and resource management. The guideline's appendix and frequently asked questions(FAQs) provided additional information needed to respond to COVID-19 in the field.

This article recommended that, to defeat COVID-19, countries must make a concerted and determined approach to prepare and, respond.

Keywords : COVID-19, response guideline

Table 1. Major revision of case definition(1st–4th edition)

	Suspected case	Patient under investigation(PUI)
1st (Jan. 4)	· A person who develops **a fever or severe respiratory symptoms** (e.g., pneumonia) within 14 days of visiting the Huanan seafood market	· A person who develops **a fever or respiratory symptoms** (e.g., cough, shortness of breath, etc.) within 14 days of visiting the **Huanan seafood market** · A person who develops **a fever or severe respiratory symptoms** (e.g., pneumonia) within 14 days of visiting **Wuhan**
2nd (Jan. 8)	· A person who develops **pneumonia or symptoms of suspected pneumonia** (e.g., shortness of breath with fever) within 14 days of visiting the Huanan seafood market	· A person who develops **a fever or respiratory symptoms** (e.g., cough etc.) within 14 days of visiting the **Huanan seafood market** · A person who develops **pneumonia or symptoms of suspected pneumonia** (e.g., shortness of breath with fever) within 14 days of visiting **Wuhan**
3rd (Jan. 17)	· A person who develops pneumonia or **symptoms of suspected pneumonia** (e.g., shortness of breath with fever) within 14 days of visiting Wuhan · A person who develops the following symptoms within 14 days of contact with a confirmed case during the confirmed case's symptomatic period – **a fever or respiratory symptoms** (e.g., cough etc.), pneumonia or **symptoms of suspected pneumonia** (e.g., shortness of breath with fever)	· A person who develops **a fever or respiratory symptoms** (e.g., cough etc.) within 14 days of visiting Wuhan
4th (Jan. 27)	· A person who develops **a fever or respiratory symptoms** (e.g., cough, sore throat, etc.) within 14 days of visiting Hubei province	· A person who develops **pneumonia** within 14 days of visiting **Mainland China**

Table 2. Major revision of case definition(5th–8th edition)

	Suspected case	Patient under investigation(PUI)
5th (Feb. 6)	· A person who develops **a fever or respiratory symptoms** (e.g., cough, sore throat, etc.) within 14 days of visiting Mainland China · A person who develops **a fever or respiratory symptoms** (e.g., cough, sore throat, etc.) within 14 days of contact with a confirmed case during the confirmed case's symptomatic period · A person who is suspected of having COVID-19, according to a physician's judgement	-
6th (Feb. 19)	· A person who develops **a fever or respiratory symptoms** (e.g., cough, sore throat, etc.) within 14 days of visiting Mainland China (including HongKong, Macau) · A person who has unknown pneumonia that requires hospitalization according to a physician's judgement	· A person who develops a fever or respiratory symptoms (e.g., cough, etc.) within 14 days of visiting countries, territories or areas with reported COVID-19 cases · A person who is suspected of having COVID-19, according to a physician's judgement
7th (Mar. 2)	· A person who develops a fever or respiratory symptoms (e.g., cough, shortness of breath, etc.) within 14 days of contact with a confirmed case during the confirmed case's symptomatic period	· A person who is suspected of having COVID-19 (unknown pneumonia etc.), according to a physician's judgement. · A person who develops a fever or respiratory symptoms (e.g., coughing, shortness of breath, etc.) within 14 days of visiting countries with local transmissions of COVID-19 · A person who develops a fever or respiratory symptoms (e.g., cough, shortness of breath, etc.) within 14 days and is epidemiologically related to domestic COVID-19 outbreaks
8th (May 18)	· A person who develops symptoms within 14 days of contact with a confirmed case during the confirmed case's symptomatic period · Main symptoms: fever, cough, shortness of breath, chill, myalgia, headache, sore throat, loss of taste/smell sense, or pneumonia etc.	· A person who is suspected of having COVID-19, according to a physician's judgement · A person who develops symptoms within 14 days of overseas travel · A person who develops symptoms within 14 days and is epidemiologically related to domestic COVID-19 outbreaks

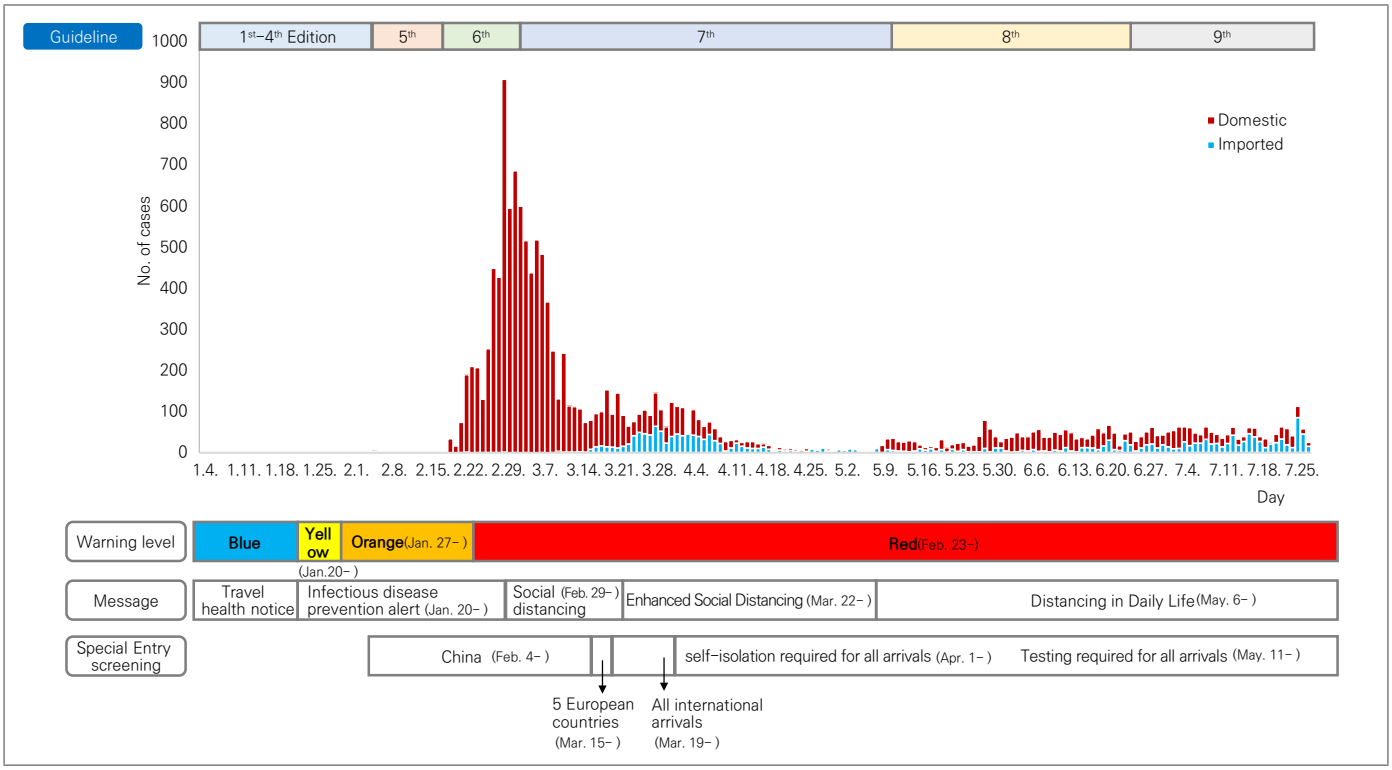

Figure 1. COVID–19 in South Korea (–July 27, 2020)

Table 3. Change in the Isolation Release Criteria for the Confirmed Cases

Previous release (Edition 8–1)		Latest release (Edition 9)
【Standards for isolation release of asymptomatic confirmed cases】 ① Two consecutive negative results from PCR tests taken at least 24 hours apart, on the 7th day after the case was confirmed ② If the result of the PCR test is positive on the 7th day after the case was confirmed, the next test date should be 7 days after the last test(i.e. 14 days from the confirmed date) → If the result is positive, the next test date should be determined by medical staff → Two consecutive negative PCR results at least 24 hours apart	⇨	【Standards for isolation release of asymptomatic confirmed cases】 Must meet ONE of the following conditions: ① Symptom based: 10 days have passed since the case was confirmed, and no clinical symptoms during this period ② Test based: 7 days have passed since the case was confirmed, and two consecutive negative PCR test results(after the 7 days) at least 24 hours apart
【Standards for isolation release of symptomatic confirmed cases】 Must meet BOTH of the following criteria, after at least 7 days since onset of illness 1) Not taking antipyretic, no fever and improvement of clinical symptoms, AND 2) Two consecutive negative PCR results at least 24 hours apart	⇨	【Standards for isolation release of symptomatic confirmed cases】 Must meet ONE of the following conditions: ① Symptom based : 10 days have passed since onset of illness, and for at least 72 hours after, meet BOTH of the following criteria: 1) No fever without antipyretic 2) Improvement of clinical symptoms ② Test based: 7 days have passed since the onset of illness, AND no fever without antipyretic and improvement of clinical symptoms, AND afterwards, two consecutive negative PCR test results at least 24 hours apart

* Polymerase chain reaction (PCR)

역학 · 관리보고서

국내 아나플라즈마증 실험실 진단검사, 2019년

질병관리본부 감염병분석센터 세균분석과 **김환희, 이경아, 황선도, 전정훈, 황규잠***

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초 록

아나플라즈마증은 *Anaplasma phagocytophilum*에 의해 진드기를 매개로 사람 및 동물에게 감염되는 인수공통감염병이다. *A. phagocytophilum*에 감염된 진드기에 물리는 경우 급격한 고열증상을 특징적으로 보이며 진드기의 활동기간인 늦봄부터 가을까지 많이 발생하는 것으로 보고되고 있다. 본 내용은 2019년 국내 아나플라즈마 감염증 의심환자로 접수된 검체 1,568건을 대상으로 간접면역형광항체법(IFA)과 유전자증폭검사(PCR)를 사용하여 실험실 진단검사를 수행한 결과보고이다. 검사결과 혈청학적 검사 건수 1,096건 중 197건(18.0%)에서 혈청반응을 관찰하였다. 남성이 103명(52.3%), 여성이 94명(47.7%)으로 분석되었고, 연령대로 구분 시, 50대 이상 환자가 139명으로 70.6%로 나타났다. 최근 5년간의 혈청학적 검사 결과, 2015년(7.0%), 2016년(5.3%), 2017년(9.4%)과 비교하여 2018년(21.3%)과 2019년(18.0%)에는 혈청반응률이 10% 이상으로 증가함을 확인하였다. 유전학적 검사 건수 472건 중 19건(4.0%)에서 양성반응을 관찰하였다. 회복기 혈청에서의 항체가가 급성기 혈청에서의 항체가 보다 4배 이상 상승하거나 IgG 값이 1:320 이상인 경우 또는 유전자 검출이 되는 경우 실험실 진단 양성으로 판정하였으며. 2016년도 1.7%(5/302), 2017년도 5.0%(30/598), 2018년도 6.6%(80/1,214)에 이어 2019년도에는 2.7%(43/1,568)의 실험실 진단 양성률을 보였다. 본 검사결과를 토대로, 의심 환자에 대한 지속적인 실험실 진단검사가 요구되며, 야외 활동 시 진드기매개감염병인 아나플라즈마증의 예방홍보도 추가되어야 할 것으로 사료된다.

주요 검색어 : 아나플라즈마증, *Anaplasma phagocytophilum*, 진드기 매개 감염병, 실험실 진단검사

들어가는 말

아나플라즈마증(Human granulocytic anaplasmosis, HGA)은 진드기매개의 인수공통감염병으로 사람을 비롯하여 개, 소 말, 양 그리고 야생동물에도 감염되며, 원인 병원체는 *Anaplasma phagocytophilum*이다. 1990년대 중반 미국에서 진드기에 물린 후 열성질환으로 사망한 환자에서 인체감염이 첫 보고되었다[1, 2]. 인체 감염을 일으키는 매개체는 참진드기로서 *Ixodes scapularis, I. pacificus, I. ricinus* 등이 있으며 각각 미국 중북부 및 동북부지역, 미국 태평양 연안지역, 유럽 서부지역에서 주된 감염을 매개하는 것으로 알려져 있고, 아시아에서는 *I. persulcatus*가 주된 매개체로 보고되어 있다[3]. 국내에서는 *Haemaphysalis longicornis, I. nipponensis, I. persulcatus*가 보고되어 있으며[4], 2003년 매개체를 대상으로 수행한 유전자 검출 검사에서 *H. longicornis, I. persulcatus* 진드기에서 *A. phagocytophilum*의 유전자가 9.9% 확인되었다[5].

아나플라즈마증은 약충 및 성충 시기의 진드기가 왕성히 활동하는 늦봄부터 가을까지 다발하는 것으로 알려져 있으며 2014년에 국내 처음으로 아나플라즈마증 환자 발생이 최초로 보고되었다. 아나플라즈마증은 감염된 진드기에 흡혈된 후 7~10일 정도의 잠복기를 거쳐 39℃ 이상의 고열이 나타나는 급성열성질환이다. *A. phagocytophilum*은 인체 면역에 관여하는 neutrophils을 감염시켜 정상세포의 자가포식유도 기능 이상으로 숙주세포를 파괴시켜 병을 일으키는 것으로 알려져 있다. 주요 임상증상으로 발열, 두통, 근육통, 오한, 권태감 등이며 혈소판 감소, 백혈구 감소, 빈혈 증가, 간세포 효소 수치 증가 그리고 미성숙한

호중구의 증가 등이 관찰된다. 감염 시 경증상을 보이나 중증 감염과 직접적인 연관성이 있어 노약자, 면역력이 낮은 환자 등에게는 치명적일 수 있다[6]. 치료는 Doxycycline 등의 항생제로 가능하며, 치사율은 1% 이하로 알려져 있다.

아나플라즈마증의 실험실 검사는 말초혈액도말을 통한 현미경관찰, 백혈구, 혈소판 검사 등의 혈액학적 검사와 간접면역형광항체법(Indirect immunofluorescence assay, IFA)과 웨스턴 블롯법 등의 혈청학적 검사, 세포배양을 통한 원인균 분리 그리고 중합효소연쇄반응(polymerase chain reaction, PCR)을 이용한 유전자 검출법이 있다.

질병관리본부는 2014년에 국내 첫 아나플라즈마증 환자 발생이 보고됨에 따라 10월부터 혈청학적 검사법과 혈액을 이용한 유전학적 검사법으로 비법정감염병인 아나플라스마증의 실험실 진단 업무를 수행하고 있다. 이 글에서는 2019년에 의뢰된 아나플라즈마증 의심환자 검체를 대상으로 실시한 혈청학적 및 유전학적 검사결과를 보고하고자 한다.

몸 말

질병관리본부에서는 아나플라즈마증의 혈청학적 실험실 검사법으로 간접면역형광항체법을 실시하였다. 1차 의뢰된 급성기 혈청의 항체가가 IgG 1:80 이상 또는 IgM 1:16 이상이면 혈청반응으로 판단하였고, 회복기 혈청의 항체가가 급성기 혈청의 항체가 결과와 비교하여 4배 이상 증가하거나 단일항체가로 IgG 값이 1:320 이상인 경우를 아나플라즈마증 항체가 양성으로 판정하였다. 또한 환자 혈액에서 *A. phagocytophilum* 16S rRNA 유전자를 확인한 경우 유전자검사 양성으로 판정하였다.

2019년에는 1,568건의 아나플라즈마증 의심환자에 대한 검사(혈청학적 검사 1,096건, 유전자검사 472건)가 의뢰되었으며, 이 중 혈청학적 검사와 유전자검사가 동시에 의뢰한 경우는 437건이었다.

IFA 방법을 이용한 아나플라즈마증 혈청학적 검사에서는 1,096건 중 197건(18.0%)이 혈청반응을 나타냈고(표 1), PCR을 통한 유전학적 검사 결과에서는 472건 중 19건(4.0%)에서 양성이 나타났다(표 2). 회복기 혈청에서의 항체가가 급성기 혈청에서의 항체가 보다 4배 이상 상승하거나 IgG 값이 1:320 이상인 경우 또는 유전자 검출이 되는 경우 실험실 진단 양성으로 판정하였으며, 2016년도 1.7%(5/302), 2017년도 5.0%(30/598), 2018년도 6.6%(80/1,214)에 이어 2019년도에는 2.7%(43/1,568)의 실험실 진단 양성률을 보였다.

검사 대상자가 양성으로 최종 판정된 경우는 연도별로 각각 2015년 4명, 2016년 4명, 2017년 13명, 2018년 32명 그리고 2019년 38명이었다.

혈청반응 197건 중 남성 103건(52.3%)으로 여성 94건(47.7%)보다 많았으나 의뢰 건수 대비 혈청반응률은 각각 16.0%와 20.8%로 나타나 여성 의심환자의 반응률이 높았다. 연령대는 10대 3건, 20대 12건, 30대 20건, 40대 23건, 50대 43건, 60대 33건 70대 47건 그리고 80세 이상 16건으로 각각 나타났고, 50대~70대에서 높은 분포를 보였으며 80대 이상인 환자까지 포함한 경우 50대 이상의

표 1. 2019년 아나플라즈마증 혈청학적 검사 반응률

	총 검사건수	혈청반응 건수 (항체가 IgG 〉1:80, 또는 IgM 〉1:16)	혈청반응률 (%)
IFA 혈청학적 검사	1,096	197	18.0

표 2. 2019년 아나플라즈마증 유전자 검사 양성 검출률

	총 검사건수	유전자 검출 건수	검출률 (%)
16S rRNA 유전학적 검사	472	19	4.0

표 3. 아나플라즈마증의 혈청학적 검사 반응자에 대한 연령별 및 성별 분포

	IFA 혈청학적 검사 혈청반응자/전체 건수								
성별/나이	0~19	20~29	30~39	40~49	50~59	60~69	70~79	over 80	Total
남성	3/7 (42.9%)	7/63 (11.1%)	12/67 (17.9%)	14/92 (15.2%)	28/116 (24.1%)	16/135 (11.9%)	18/123 (14.6%)	5/42 (11.9%)	103/645 (16.0%)
여성	0/1 (0.0%)	5/28 (17.9%)	8/37 (21.6%)	9/40 (22.5%)	15/75 (20.0%)	17/98 (17.3%)	29/107 (27.1%)	11/65 (16.9%)	94/451 (20.8%)
총합	3/8 (37.5%)	12/91 (13.2%)	20/104 (19.2%)	23/132 (17.4%)	43/191 (22.5%)	33/233 (14.2%)	47/230 (20.4%)	16/107 (15.0%)	197/1,096 (18.0%)

표 4. 아나플라즈마증의 유전자 검출건수에 대한 연령별 및 성별 분포

	16S rRNA 유전학적 검사 검출 건수/전체 건수								
성별/나이	0~19	20~29	30~39	40~49	50~59	60~69	70~79	over 80	Total
남성	0/3 (0.0%)	0/25 (0.0%)	0/27 (0.0%)	1/42 (2.4%)	0/60 (0.0%)	2/52 (3.8%)	1/52 (1.9%)	1/20 (5.0%)	5/281 (1.8%)
여성	0/1 (0.0%)	0/15 (0.0%)	0/15 (0.0%)	0/12 (0.0%)	0/29 (0.0%)	0/37 (0.0%)	9/49 (18.4%)	5/33 (15.2%)	14/191 (7.3%)
총합	0/4 (0.0%)	0/40 (0.0%)	0/42 (0.0%)	1/54 (1.9%)	0/89 (0.0%)	2/89 (2.2%)	10/101 (9.9%)	6/53 (11.3%)	19/472 (4.0%)

혈청반응률은 70.6%로 50대 미만의 연령대보다 높았다(표 3).

유전학적 검사에서 양성결과를 보인 19건 중 남성은 5건(26.3%), 여성은 14건(73.7%) 이었으며 의뢰 건수 대비 유전자 검출률은 각각 1.8%와 7.3%로 여성 의심환자 검체에서 높은 검출률을 나타냈으며, 대부분은 60대 이상의 연령대에서 확인되었다(표 4). 유전학적 검사에서 양성결과를 보인 19건 중 15건(79.0%)은 혈청반응에서도 양성이었다.

질병관리본부에 의뢰된 아나플라즈마증 의심 혈청학적 검사 건수는 2015년의 경우 201건이었고 이 중 7.0%의 혈청반응률과 2.5%의 유전자 양성률을 보였으며 2016년은 총 의뢰건수 302건, 5.3%의 혈청반응률과 2.9%의 유전자 양성률을 보였다. 2017년에는 총 의뢰건수 598건, 혈청반응률이 9.4%, 유전자 양성률이 8.4%를 차지하였고 2018년은 총 의뢰건수 886건 중 혈청반응률 21.3%, 유전자 양성률 7.9%를 보여 이전의 10%이하였던 혈청반응 환자가 20%대로 증가하였다. 2019년에는 1,096건의 혈청학적 검사와 472건의 유전학적 검사가 의뢰되었고 혈청반응률은 18.0%, 유전자 양성률은 4.0%를 나타내었다. 최근 5년 동안 아나플라즈마증 혈청학적 검사 의뢰 건수는 201건에서 1,096건으로 꾸준히 증가하였고 혈청반응률 또한 2015년(7.0%), 2016년(5.3%), 2017년(9.4%)과 비교하여 2018년(21.3%)과 2019년(18.0%)에는 10% 이상으로 증가함을 확인하였다(그림 1).

2019년 아나플라즈마증 진단검사로 의뢰된 1,568건을 지역별로 구분하면 광주가 310건(19.8%), 서울이 303건(19.3%), 경기가 204건(13.0%), 전북 181건(11.5%), 충남 151건(9.6%), 전남 103건(6.6%), 충북 93건(5.9%), 강원 57건(3.6%) 순으로 많았으며 그 외의 나머지 기타 지역에서 166건(10.6%)이 의뢰되었다.

월별 발생 현황을 관찰하면 4월부터 증가하여 11월까지 발생건수가 높게 유지되는 것을 관찰할 수 있는데, 이는 성체 진드기

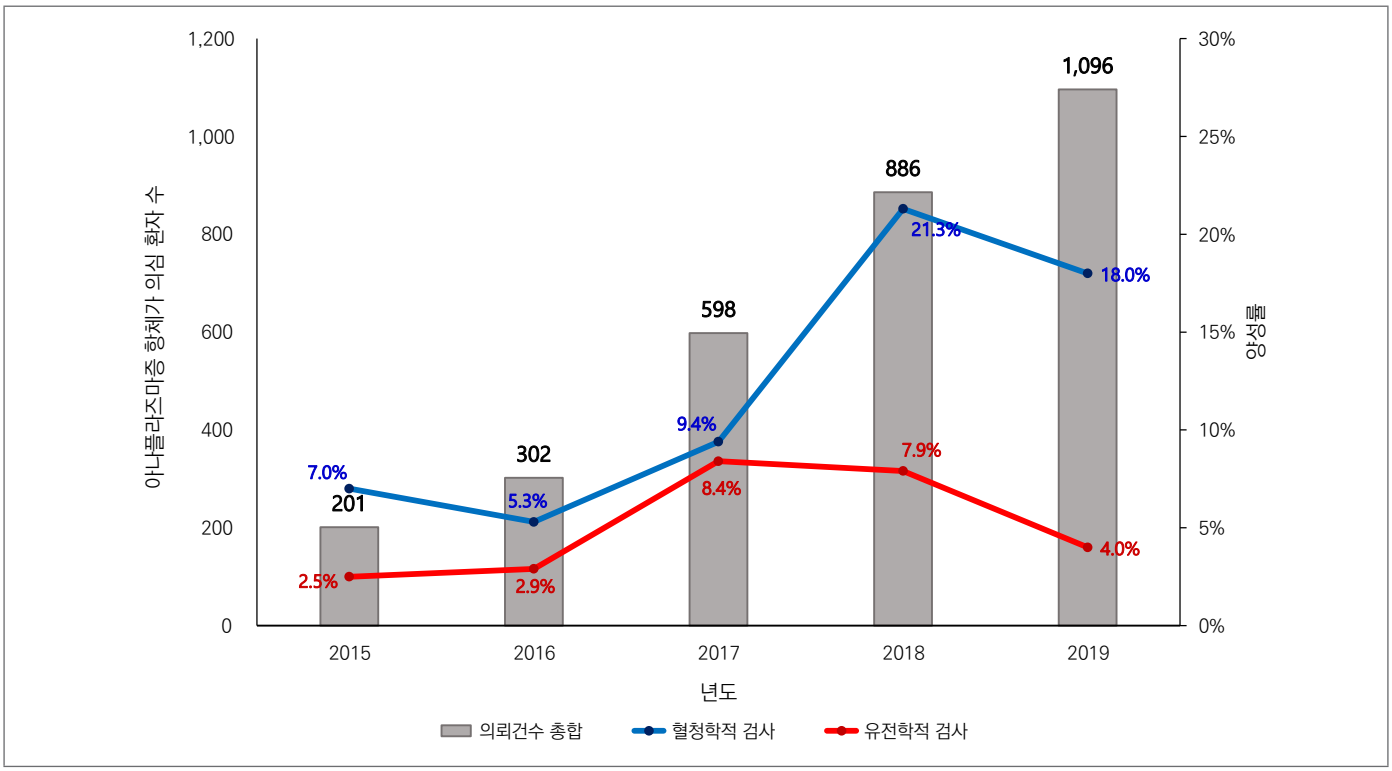

그림 1. 아나플라즈마증 의심환자의 혈청학적 및 유전학적 검사에 대한 양성률 추이, 2015~2019년

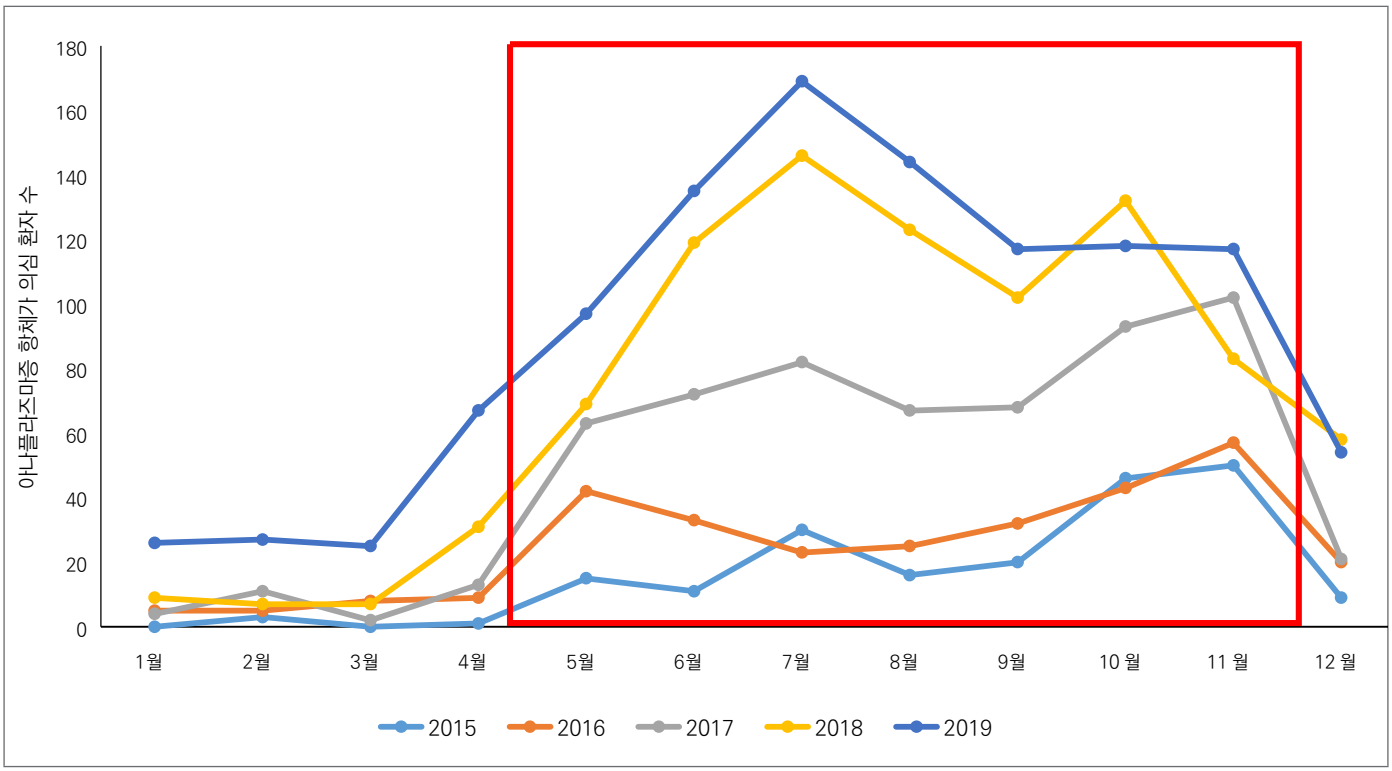

그림 2. 2015~2019년 월별 아나플라즈마증 의심 환자 항체가 검사 의뢰 건수

활동이 예상되는 시기와 일치하며 감염자가 야외 활동을 하다가 활동 중인 진드기와 접촉하여 감염되는 것으로 예상된다(그림 2).

맺는 말

아나플라즈마증은 진드기에 의해 매개되는 인수공통감염병으로 *A. phagocytophilum*의 주요 매개체는 *Ixodes* 속과 *Haemaphysalis* 속의 진드기 등이며 이들에 의해 전파가 가능한 것으로 알려져 있다. 사람에게 아나플라즈마증을 일으키는 매개로서의 동물의 역할은 아직 정확히 밝혀지지 않았지만 야생의 쥐, 다람쥐 등의 설치류가 동물감염증 발생에서 주요 역할을 할 것으로 예상된다. 국내의 경우 동물에서 아나플라즈마증 발생에 대한 조사에서 고라니 감염률이 63%로 나타나 상당히 많은 수가 감염되었을 것으로 보고되었다[7].

국외의 경우, 북미에서는 2008~2012년 아나플라즈마증 역학조사 결과 연간 평균 아나플라즈마증 환자 발생 수는 10만 명당 6.3명의 확률로 발병하였으며 환자 중 60세 이상의 고령에서 높은 발생이 관찰됨을 보고하였다[8]. 미국에서 아나플라즈마증의 발생이 높은 지역은 라임병과 바베시아 감염증의 발생률이 높은 지역과 일치하는 경향을 보였는데, 이는 아나플라즈마증의 주요 매개체 중 하나인 *I. pacificus* 진드기가 해당 질병들의 원인이 되는 원인균을 전파하는 것으로 알려져 있다[9].

아나플라즈마증에 감염된 경우 고열, 두통, 근육통, 권태감, 오한 등의 증상이 관찰 기능하고 드물게 피부 발진을 보이기도 한다. 혈소판 감소, 백혈구 감소, 가벼운 빈혈 및 간수치 이상 등이 나타나며 염증 반응 증가 또한 특징으로 나타나는데, 이는 아나플라즈마에 의한 세포 손상에 기인한 것으로 알려져 있다[1]. 이번 2019년 아나플라즈마증 진단검사 의뢰 환자 중 양성반응을 나타낸 환자들 또한 발열, 무기력증, 근육통 등의 증상을 보였으며 야외활동을 하다가 진드기에 물린 경우가 많았다. 중장년층에서 높은 발생률을 보였으며, 농사와 밭일 등을 하거나 야외활동을 하다가 감염되는 경우가 많아 직업과 생활환경이 감염에 영향을 미침을 예측할 수 있었다.

본 아나플라즈마 진단검사 결과가 국내 아나플라즈마증 발생 현황 및 양성률 추세에 대한 정보를 제공하고 있다. 아나플라즈마증이 이전에는 잘 알려지지 않아 진단이 제대로 이뤄지지 않았을 것으로 예상되나 앞으로는 진드기에 물리거나 관련된 임상증상이 있는 경우 아나플라즈마증에 대한 진단검사와 해당 감염병의 예방을 위한 인식 확산이 필요할 것으로 생각되며, 본 내용이 국내 아나플라즈마증 발생에 대한 현황 및 근거자료로 활용되기를 기대한다.

① 이전에 알려진 내용은?

아나플라즈마증은 진드기에 의해 감염되는 인수공통감염병이며 *A. phagocytophilum*에 감염된 진드기에 물리는 경우 고열, 두통, 근육통 등의 증세를 보인다. 지난해 주간 건강과 질병 제12권 제23호에서는 2018년도 아나플라즈마증 실험실 진단 검사 결과 현황 및 추이를 살펴본 바 있다.

② 새로이 알게 된 내용은?

2019년 국내 아나플라즈마증 의뢰건수는 혈청학적 검사 1,096건, 유전학적 검사 472건이었으며 혈청학적 검사에서 18.0%의 혈청반응을, 유전학적 검사에서는 4.0%의 양성률을 관찰하였다. 질병관리본부에서 2014년 10월 아나플라즈마증 실험실검사를 시작한 이래로 최근 5년간의 혈청학적 검사 결과, 2015년(7.0%), 2016년(5.3%), 2017년(9.4%)과 비교하여 2018년(21.3%), 2019년(18.0%)에는 혈청반응률이 10% 이상으로 증가함을 확인하였다

③ 시사점은?

해마다 아나플라즈마증 의심 환자수와 혈청반응 환자가 증가하므로 진드기에 물리거나 관련된 임상증상이 있는 경우 아나플라즈마증에 대한 진단검사와 아나플라즈마증 예방을 위한 인식 확산이 필요할 것으로 보인다.

참고문헌

1. Chen SM, Dumler JS, Bakken JS, Walker DH. Identification of a granulomcytotrophic Ehrlichia species as the etiologic agent of human disease. J Clin Microbiol. 1994;32:589–595.
2. Eisen RJ, Eisen L, Beard CB. County–scale distribution of Ixodes scapularis and *Ixodes pacificus* (Acari: *Ixodidae*) in the continental United States. J Med Entomol 2016;v237.
3. Dumler JS, Choi KS, Garcia–Garcia JC, Barat NS, *et al*. Human graulocytic anaplasmosis and *Anaplasma phagocytophilum*, 2005. Emerg Infec Dis. 2005;11:1828–1834.
4. Kim KH, Yi J, Oh WS, Kim N H, *et al*. Human graulocytic anaplasmosis, South Korea, 2013. Emerg Infec Dis. 2014;20:1708–1711.
5. Kim CM, Kim MS, Park MS, Park JH, *et al*. Identification of *Ehrlichia chaffeensis, Anaplasma phagocytophilum*, and *A. bovis in Haemaphysalis longicornis and Ixodes persulcatus* ticks from korea. Vector Borne Zoonotic Dis. 2003;3:17–26.
6. Bakken JS, Dumler JS. Clinical diagnosis and treatment of human granulocytotropic anaplasmosis. Ann N Y Acad Sci. 2006;1078:236–247.
7. Kang JG, Ko S, Kim YJ, Yang HJ, *et al*. New genetic variants of *Anaplasma phagocytophilum* and Anaplasma bovis from Korean water deer (*Hydropotes inermis argyropus*). Vector Borne Zoonotic Dis. 2011;11:929–938.
8. Dahlgren FS, Heitman KN, Drexler NA, Massung RF, Behravesh CB. Human granulocytic anaplasmosis in the United States from 2008 to 2012: a summary of national surveillance data. Am J Trop Med Hyg 2015;93:66–72.
9. Diagnosis and Management of Tickborne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichioses, and Anaplasmosis — United States. 2016. Centers for Disease Control and Prevention MMWR Morbidity and Mortality Weekly Report Vol. 65; No.2.

Abstract

Laboratory Diagnostic Test of Human Granulocytic Anaplasmosis in Korea, 2019

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Human granulocytic anaplasmosis (HGA) is a zoonotic tick-borne disease caused by *Anaplasma phagocytophilum* (*A. phagocytophilum*), which is transmitted to humans by tick bites. Typical symptoms include high fever, headaches, chills and muscle aches occurring within 1-2 weeks of a tick bite. This study presented the results of the laboratory diagnosis of 1,568 cases of HGA in suspected patients in 2019. This study performed serological tests for HGA using indirect immunofluorescent antibody assay (IFA) using the sera of 1,096 patients and amplification of the 16S rRNA gene of *A. phagocytophilum* by nested polymerase chain reaction (PCR) of 472 blood samples. As a result of the IFA test, 197 (18.0%) of the 1,096 cases were reactive for Immunoglobulin G (IgG) or Immunoglobulin M (IgM) against *A. phagocytophilum*. In terms of participants, there were 103 males (52.3%) and 94 females (47.7%), and 139 cases were aged 50 years and over (70.6%). The serum response rates in 2018 (21.3%) and 2019 (18.0%) were compared to 2015 (7.0%), 2016 (5.3%), and 2017 (9.4%). In the last 5 years of serological testing, it was confirmed that the increase in serum response rate was more than 10%. In addition, nineteen out of 472 genetic PCR tests (4.0%) showed positive results. Either the antibody titer in the recovery serum was more than four times higher than that in the acute serum, or the IgG value was 1:320 or higher, or gene detection was judged as diagnostically positive. According to the laboratory diagnostic criteria, the positive rate of HGA was 1.7% (5/302 cases) in 2016 and 5.0% (30/598 cases) in 2017, 6.6% (80/1,214 cases) in 2018 and 2.7% (43/1,568 cases) in 2019. Based on these results, this study concluded that laboratory diagnosis tests for suspected patients are required. Furthermore, this study recommended that disease precautions during outdoor activities must be taken to prevent HGA.

Keywords: Human granulocytic anaplasmosis (HGA), Anaplasmosis, *Anaplasma phagocytophilum*, Laboratory diagnosis

Table 1. Seroreactivity of *A. phagocytophilum* serological tests from anaplasmosis-suspected patients in South Korea, 2019

	Total	No. of seroreactives*	Seroreactivity (%)
IFA test	1,096	197	18.0

*Seroreactives were determined as antibody titer over 1:80 anti-IgG or 1:16 anti-IgM by IFA (Indirect immunofluorescent antibody assay) according to the manufactures criteria.

Table 2. Positivity of *A. phagocytophilum* polymerase chain reaction (PCR) amplification from anaplasmosis-suspected patients in South Korea, 2019

	Total	No. of positives*	Positivity (%)
16S rRNA PCR test	472	19	4.0

*Positives of polymerase chain reaction (PCR) were amplified using the 16S rRNA gene of *A. phagocytophilum*.

Table 3. Sex and age characteristics in seroreactive patients with human granulocytic anaplasmosis (HGA) by indirect immunofluorescent antibody assay (IFA) in South Korea, 2019

No. of IFA patients with seroreaction / total (%)									
Sex/Age	0-19	20-29	30-39	40-49	50-59	60-69	70-79	over 80	Total
Male	3/7 (42.9%)	7/63 (11.1%)	12/67 (17.9%)	14/92 (15.2%)	28/116 (24.1%)	16/135 (11.9%)	18/123 (14.6%)	5/42 (11.9%)	103/645 (16.0%)
Female	0/1 (0.0%)	5/28 (17.9%)	8/37 (21.6%)	9/40 (22.5%)	15/75 (20.0%)	17/98 (17.3%)	29/107 (27.1%)	11/65 (16.9%)	94/451 (20.8%)
Total	3/8 (37.5%)	12/91 (13.2%)	20/104 (19.2%)	23/132 (17.4%)	43/191 (22.5%)	33/233 (14.2%)	47/230 (20.4%)	16/107 (15.0%)	197/1096 (18.0%)

Table 4. Sex and age characteristics in polymerase chain reaction (PCR) positive patients with human granulocytic anaplasmosis (HGA) by PCR test in South Korea, 2019

No. of 16S rRNA PCR positive patients / total (%)									
Sex/Age	0-19	20-29	30-39	40-49	50-59	60-69	70-79	over 80	Total
Male	0/3 (0.0%)	0/25 (0.0%)	0/27 (0.0%)	1/42 (2.4%)	0/60 (0.0%)	2/52 (3.8%)	1/52 (1.9%)	1/20 (5.0%)	5/281 (1.8%)
Female	0/1 (0.0%)	0/15 (0.0%)	0/15 (0.0%)	0/12 (0.0%)	0/29 (0.0%)	0/37 (0.0%)	9/49 (18.4%)	5/33 (15.2%)	14/191 (7.3%)
Total	0/4 (0.0%)	0/40 (0.0%)	0/42 (0.0%)	1/54 (1.9%)	0/89 (0.0%)	2/89 (2.2%)	10/101 (9.9%)	6/53 (11.3%)	19/472 (4.0%)

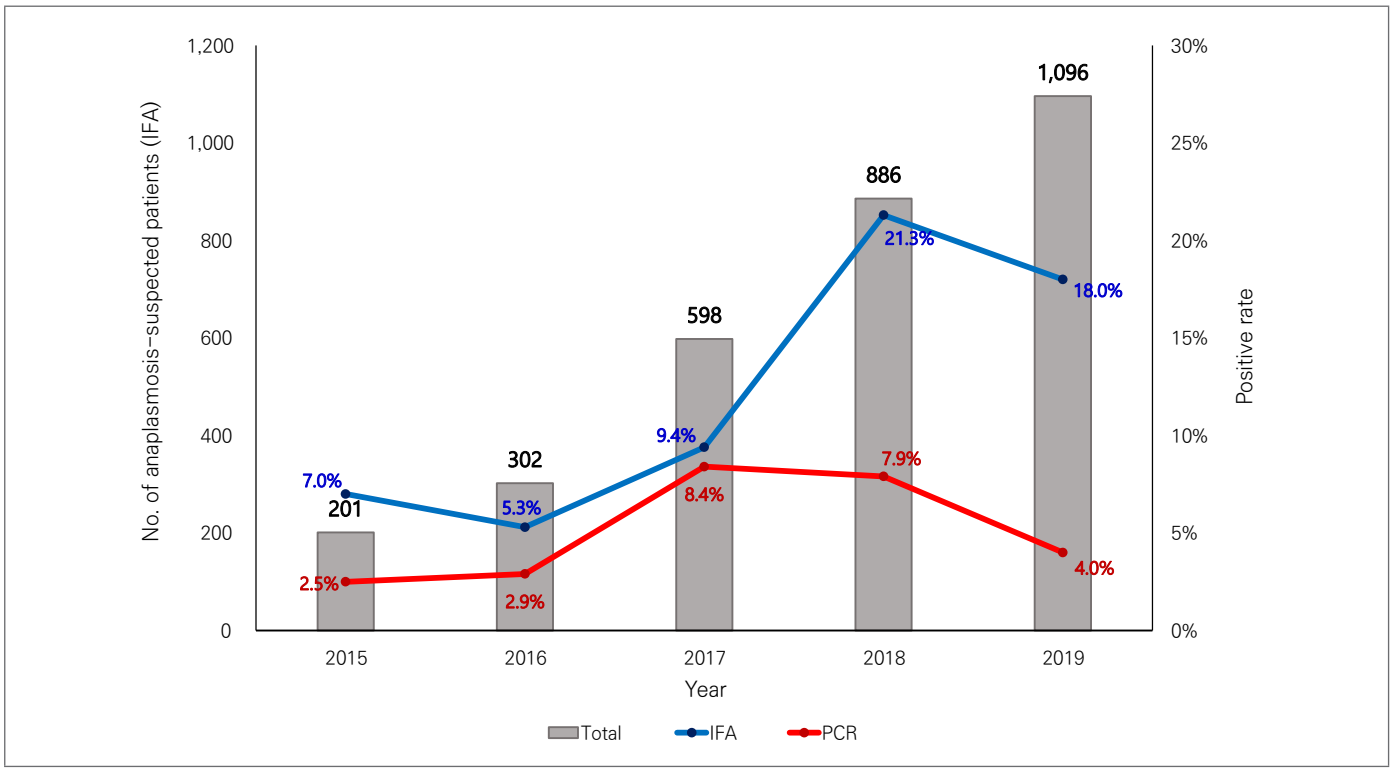

Figure 1. Seroreactive rate of indirect immunofluorescent antibody assay (IFA) and positive rate of polymerase chain reaction (PCR) from human granulocytic anaplasmosis (HGA)–suspected patients in South Korea, 2015–2019

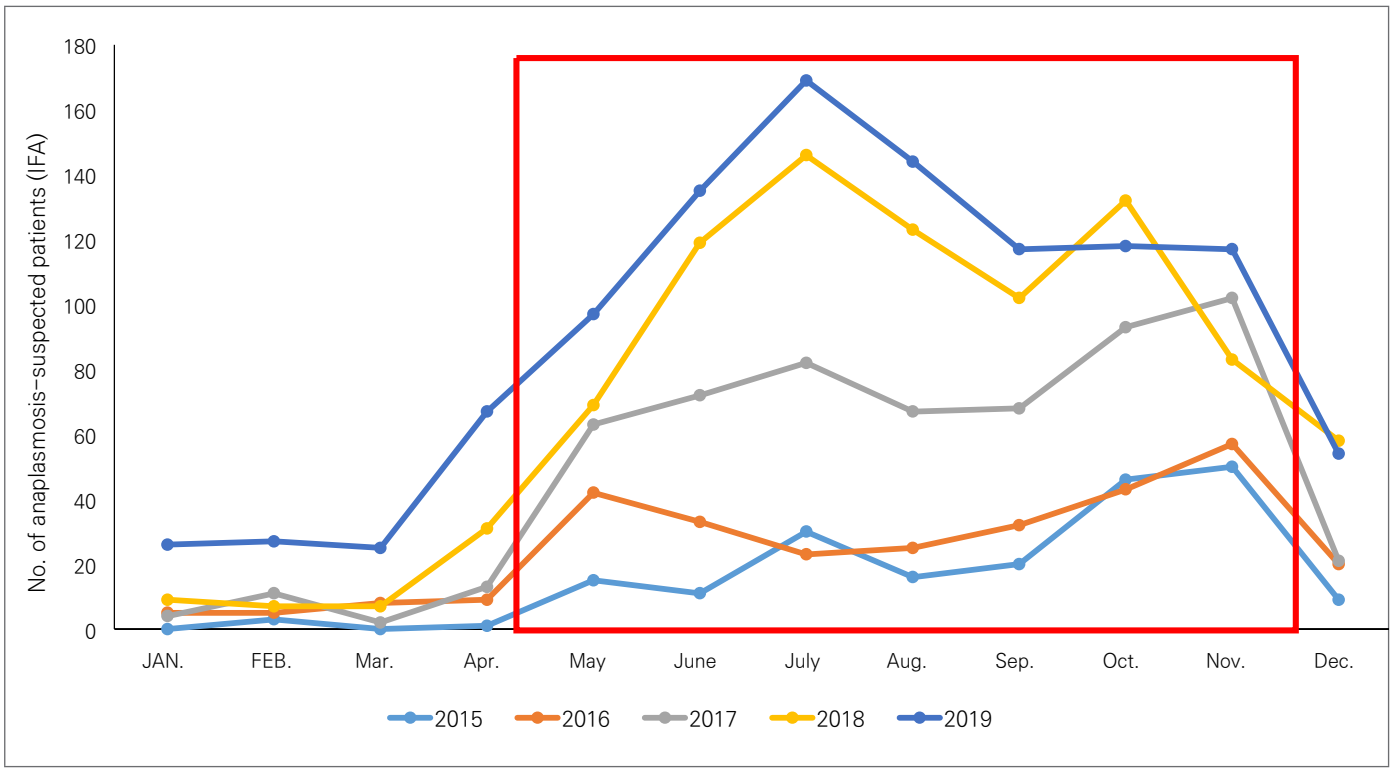

Figure 2. Monthly rate of human granulocytic anaplasmosis (HGA)–suspected patients in South Korea, 2015–2019

1.1 환자감시 : 전수감시 감염병 주간 발생 현황 (31주차)

표 1. 2020년 31주차 보고 현황(2020. 8. 1. 기준)*

단위 : 보고환자수†

감염병†	금주	2020년 누계	5년간 주별 평균§	연간현황					금주 해외유입현황 : 국가명(신고수)
				2019	2018	2017	2016	2015	
제2급감염병									
결핵	460	12,329	554	23,821	26,433	28,161	30,892	32,181	
수두	362	23,328	1,025	82,868	96,467	80,092	54,060	46,330	
홍역	0	7	0	194	15	7	18	7	
콜레라	0	0	0	1	2	5	4	0	
장티푸스	4	70	2	94	213	128	121	121	
파라티푸스	2	100	1	55	47	73	56	44	
세균성이질	0	42	3	151	191	112	113	88	
장출혈성대장균감염증	8	271	5	146	121	138	104	71	
A형간염	59	2,166	158	17,598	2,437	4,419	4,679	1,804	
백일해	1	115	14	496	980	318	129	205	
유행성이하선염	202	6,742	300	15,967	19,237	16,924	17,057	23,448	
풍진	0	2	0	8	0	7	11	11	
수막구균 감염증	0	6	0	16	14	17	6	6	
폐렴구균 감염증	2	248	5	526	670	523	441	228	
한센병	0	3	0	4					
성홍열	20	1,958	168	7,562	15,777	22,838	11,911	7,002	
반코마이신내성황색 포도알균(VRSA) 감염증	0	1	–	3	0	0	–	–	
카바페넴내성장내세균 속균종(CRE) 감염증	222	9,142	–	15,369	11,954	5,717	–	–	
E형간염	5	19	–	–	–	–	–	–	
제3급감염병									
파상풍	0	22	1	31	31	34	24	22	
B형간염	7	211	6	389	392	391	359	155	
일본뇌염	0	0	0	34	17	9	28	40	
C형간염	140	6,958	207	9,810	10,811	6,396	–	–	
말라리아	10	201	30	559	576	515	673	699	
레지오넬라증	4	205	6	501	305	198	128	45	
비브리오패혈증	2	15	2	42	47	46	56	37	
발진열	2	9	0	14	16	18	18	15	
쯔쯔가무시증	13	376	27	4,005	6,668	10,528	11,105	9,513	
렙토스피라증	2	37	2	138	118	103	117	104	
브루셀라증	0	5	0	1	5	6	4	5	
신증후군출혈열	4	86	7	399	433	531	575	384	
후천성면역결핍증(AIDS)	16	456	17	1,005	989	1,008	1,060	1,018	
크로이츠펠트–야콥병(CJD)	1	56	1	53	53	36	42	33	
뎅기열	0	43	6	273	159	171	313	255	
큐열	3	48	2	162	163	96	81	27	
라임병	0	5	1	23	23	31	27	9	
유비저	0	1	0	8	2	2	4	4	
치쿤구니야열	0	0	0	16	3	5	10	2	
중증열성혈소판감소증후군(SFTS)	4	89	8	223	259	272	165	79	
지카바이러스감염증	0	0	–	3	3	11	16	–	

* 2020년 통계는 변동가능한 잠정통계이며, 2020년 누계는 1주부터 금주까지의 누계를 말함
† 각 감염병별로 규정된 신고범위(환자, 의사환자, 병원체보유자)의 모든 신고건을 포함함
† 미포함 질병: 에볼라바이러스병, 마버그열, 라싸열, 크리미안콩고출혈열, 남아메리카출혈열, 리프트밸리열, 두창, 페스트, 탄저, 보툴리눔독소증, 야토병, 신종감염병증후군, 중증급성호흡기증후군(SARS), 중동호흡기증후군(MERS), 동물인플루엔자 인체감염증, 신종인플루엔자, 디프테리아, 폴리오, b형헤모필루스인플루엔자, 발진티푸스, 공수병, 황열, 웨스트나일열, 진드기매개뇌염
§ 최근 5년(2015~2019년)의 해당 주의 신고 건수와 이전 2주, 이후 2주 동안의 신고 건수(총 29주) 평균임

표 2. 지역별 보고 현황(2020. 8. 1. 기준)(31주차)*

단위 : 보고환자수†

지역	제2급감염병											
	결핵			수두			홍역			콜레라		
	금주	2020년 누계	5년 누계 평균‡	금주	2020년 누계	5년 누계 평균‡	금주	2020년 누계	5년 누계 평균‡	금주	2020년 누계	5년 누계 평균‡
전국	460	12,329	17,234	362	23,328	41,879	0	7	40	0	0	0
서울	80	2,150	3,137	56	2,779	4,563	0	2	6	0	0	0
부산	37	828	1,212	19	1,285	2,417	0	0	2	0	0	0
대구	20	587	815	22	1,135	2,270	0	0	2	0	0	0
인천	17	657	900	20	1,184	2,063	0	0	2	0	0	0
광주	14	319	432	9	1,103	1,340	0	0	0	0	0	0
대전	15	277	376	9	762	1,123	0	0	5	0	0	0
울산	11	224	360	21	471	1,297	0	0	0	0	0	0
세종	1	49	54	6	203	11,820	0	0	14	0	0	0
경기	89	2,591	3,687	90	6,032	1,135	0	3	1	0	0	0
강원	16	533	740	8	696	1,070	0	0	0	0	0	0
충북	12	370	534	4	859	1,537	0	0	1	0	0	0
충남	24	642	807	11	832	1,753	0	0	1	0	0	0
전북	28	503	674	18	936	1,723	0	0	2	0	0	0
전남	18	656	904	1	865	2,233	0	1	2	0	0	0
경북	39	943	1,249	18	1,269	3,990	0	0	2	0	0	0
경남	35	829	1,140	36	2,382	1,121	0	1	0	0	0	0
제주	4	171	212	14	535	424	0	0	0	0	0	0

* 2020년 통계는 변동가능한 잠정통계임
† 각 감염병별로 규정된 신고범위(환자, 의사환자, 병원체보유자)의 모든 신고건을 포함함
‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제2급감염병											
	장티푸스			파라티푸스			세균성이질			장출혈성대장균감염증		
	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†
전국	4	70	94	2	100	30	0	42	80	8	271	68
서울	1	10	19	0	9	5	0	9	18	0	20	11
부산	0	7	8	0	32	3	0	4	5	0	5	2
대구	0	3	3	1	13	2	0	0	4	0	5	2
인천	0	8	6	0	2	2	0	4	8	0	7	5
광주	0	2	1	0	4	1	0	2	2	0	14	10
대전	2	2	5	0	0	1	0	0	1	1	7	1
울산	0	1	2	0	0	0	0	2	1	0	8	2
세종	0	0	21	0	0	6	0	0	16	0	0	11
경기	1	19	2	0	8	1	0	12	1	2	129	4
강원	0	1	3	0	6	1	0	0	2	0	3	3
충북	0	1	4	0	1	0	0	0	5	0	3	2
충남	0	3	1	0	5	2	0	2	2	0	6	1
전북	0	1	4	1	3	2	0	0	4	0	5	4
전남	0	1	4	0	8	1	0	1	5	0	12	3
경북	0	4	7	0	2	2	0	2	5	3	16	3
경남	0	7	3	0	5	1	0	4	1	2	18	3
제주	0	0	1	0	2	0	0	0	0	0	13	1

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† 각 감염병별로 규정된 신고범위(환자, 의사환자, 병원체보유자)의 모든 신고건을 포함함
‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제2급감염병											
	A형간염			백일해			유행성이하선염			풍진		
	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†
전국	59	2,166	4,064	1	115	211	202	6,742	11,885	0	2	3
서울	13	404	774	0	14	27	19	854	1,217	0	0	1
부산	3	63	149	0	6	17	18	365	753	0	1	0
대구	1	52	63	0	5	5	7	262	411	0	0	0
인천	7	231	283	1	6	13	12	358	520	0	0	0
광주	3	45	71	0	10	10	8	251	628	0	0	0
대전	6	95	398	0	7	4	6	183	287	0	0	0
울산	2	28	29	0	2	6	6	181	403	0	0	0
세종	0	12	1,245	0	0	33	3	31	3,077	0	0	1
경기	10	687	73	0	17	2	71	1,975	364	0	1	0
강원	2	57	197	0	0	5	6	215	262	0	0	0
충북	2	78	306	0	0	4	2	203	458	0	0	0
충남	3	120	140	0	4	5	7	302	801	0	0	0
전북	2	124	92	0	2	11	5	299	575	0	0	1
전남	1	34	72	0	20	15	2	257	585	0	0	0
경북	2	72	92	0	9	48	9	324	1,343	0	0	0
경남	2	49	20	0	12	3	17	564	154	0	0	0
제주	0	15	60	0	1	3	4	118	47	0	0	0

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‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제2급감염병						제3급감염병					
	수막구균 감염증			성홍열			파상풍			B형간염		
	금주	2020년 누계	5년 누계 평균‡	금주	2020년 누계	5년 누계 평균‡	금주	2020년 누계	5년 누계 평균‡	금주	2020년 누계	5년 누계 평균‡
전국	0	6	9	20	1,958	8,621	0	22	16	7	211	199
서울	0	1	2	4	279	1,149	0	2	1	0	35	35
부산	0	1	1	1	118	619	0	2	1	0	10	15
대구	0	0	1	0	41	308	0	1	1	0	7	6
인천	0	1	1	0	101	400	0	0	0	0	13	11
광주	0	0	0	1	222	401	0	1	1	0	4	4
대전	0	0	0	0	78	316	0	0	1	0	11	8
울산	0	0	0	1	76	386	0	0	0	1	6	5
세종	0	0	2	0	11	2,524	0	1	1	0	2	46
경기	0	2	1	3	497	136	0	2	1	4	56	6
강원	0	0	0	0	36	152	0	1	0	0	6	7
충북	0	0	0	1	24	385	0	2	1	0	5	11
충남	0	0	0	1	64	290	0	5	1	0	8	11
전북	0	0	0	1	53	326	0	3	3	1	10	10
전남	0	0	0	1	88	435	0	1	2	0	9	11
경북	0	1	1	0	75	654	0	1	2	0	9	11
경남	0	0	0	4	148	94	0	0	0	1	19	2
제주	0	0	0	2	47	46	0	0	0	0	1	0

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‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제3급감염병											
	일본뇌염			말라리아			레지오넬라증			비브리오패혈증		
	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†
전국	0	0	0	10	201	376	4	205	120	2	15	5
서울	0	0	0	2	45	51	0	59	33	0	4	1
부산	0	0	0	0	2	4	1	12	8	0	0	0
대구	0	0	0	1	3	5	1	6	4	0	0	0
인천	0	0	0	4	27	51	0	10	9	0	0	0
광주	0	0	0	0	4	3	0	7	2	0	0	0
대전	0	0	0	0	3	2	0	3	1	0	0	0
울산	0	0	0	0	3	3	0	1	2	0	0	0
세종	0	0	0	0	0	218	0	0	26	0	0	1
경기	0	0	0	2	89	13	0	45	5	0	2	0
강원	0	0	0	1	12	3	1	3	5	0	0	0
충북	0	0	0	0	2	4	0	10	3	0	0	0
충남	0	0	0	0	4	2	0	4	3	0	1	0
전북	0	0	0	0	2	3	0	8	4	0	0	2
전남	0	0	0	0	0	4	0	10	9	1	2	0
경북	0	0	0	0	2	6	1	7	4	0	1	1
경남	0	0	0	0	3	3	0	9	2	1	4	0
제주	0	0	0	0	0	1	0	11	0	0	1	0

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‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제3급감염병											
	발진열			쯔쯔가무시증			렙토스피라증			브루셀라증		
	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†
전국	2	9	6	13	376	713	2	37	31	0	5	1
서울	0	1	1	0	5	32	0	2	1	0	1	1
부산	0	0	0	1	22	26	0	3	1	0	0	0
대구	0	0	0	0	1	6	1	2	0	0	0	0
인천	2	7	1	0	5	14	0	1	0	0	0	0
광주	0	0	1	0	4	16	0	0	1	0	0	0
대전	0	0	0	1	10	17	0	4	0	0	0	0
울산	0	0	0	0	11	16	0	0	1	0	0	0
세종	0	0	1	0	4	66	0	1	7	0	0	0
경기	0	0	0	0	28	19	0	3	2	0	0	0
강원	0	0	0	0	4	13	0	1	2	0	0	0
충북	0	0	1	0	7	69	0	1	4	0	0	0
충남	0	0	0	2	37	67	0	4	1	0	0	0
전북	0	0	1	4	55	176	0	5	4	0	3	0
전남	0	0	0	1	91	47	1	6	3	0	1	0
경북	0	0	0	1	9	120	0	2	3	0	0	0
경남	0	0	0	3	73	7	0	2	1	0	0	0
제주	0	1	0	0	10	2	0	0	0	0	0	0

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‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제3급감염병											
	신증후군출혈열			크로이츠펠트-야콥병(CJD)			뎅기열			큐열		
	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†
전국	4	86	165	1	56	28	0	43	112	3	48	65
서울	0	3	7	0	13	7	0	14	37	0	1	4
부산	0	0	5	0	7	2	0	5	6	0	1	1
대구	0	2	2	0	4	1	0	2	6	0	0	2
인천	0	2	2	0	5	1	0	2	6	0	1	1
광주	0	1	2	0	2	0	0	0	1	0	1	3
대전	0	1	3	0	1	1	0	0	2	0	2	1
울산	0	0	1	0	1	0	0	1	2	0	0	2
세종	0	0	44	0	0	6	0	0	30	0	0	9
경기	0	11	7	0	12	1	0	13	3	0	7	0
강원	1	10	10	0	0	1	0	0	2	0	0	14
충북	0	4	19	0	3	1	0	0	3	0	9	9
충남	0	7	14	0	1	1	0	2	2	2	6	3
전북	1	15	24	0	2	1	0	0	3	0	3	7
전남	1	14	16	0	1	3	0	1	3	1	13	4
경북	1	10	8	1	1	2	0	1	4	0	0	5
경남	0	3	1	0	3	0	0	1	2	0	4	0
제주	0	3	0	0	0	0	0	1	0	0	0	0

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† 각 감염병별로 규정된 신고범위(환자, 의사환자, 병원체보유자)의 모든 신고건을 포함함
‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

표 2. *(계속)* **지역별 보고 현황(2020. 8. 1. 기준)(31주차)***

단위 : 보고환자수†

지역	제3급감염병								
	라임병			중증열성혈소판감소증후군(SFTS)			지카바이러스감염증		
	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†	금주	2020년 누계	5년 누계 평균†
전국	0	5	10	4	89	81	0	0	–
서울	0	2	4	0	2	2	0	0	–
부산	0	0	0	0	0	1	0	0	–
대구	0	0	0	0	4	1	0	0	–
인천	0	0	1	0	3	1	0	0	–
광주	0	0	0	0	0	0	0	0	–
대전	0	0	0	0	1	1	0	0	–
울산	0	0	0	0	4	1	0	0	–
세종	0	0	2	0	0	12	0	0	–
경기	0	0	0	0	3	12	0	0	–
강원	0	2	0	2	14	2	0	0	–
충북	0	0	1	0	2	10	0	0	–
충남	0	1	1	1	9	5	0	0	–
전북	0	0	0	0	4	6	0	0	–
전남	0	0	1	0	5	11	0	0	–
경북	0	0	0	0	13	10	0	0	–
경남	0	0	0	0	18	6	0	0	–
제주	0	0	0	1	7	0	0	0	–

* 2020년 통계는 변동가능한 잠정통계임
† 각 감염병별로 규정된 신고범위(환자, 의사환자, 병원체보유자)의 모든 신고건을 포함함
‡ 최근 5년(2015~2019년)의 1주부터 해당 주까지 누계의 평균임

1.2 환자감시 : 표본감시 감염병 주간 발생 현황 (31주차)

1. 인플루엔자 주간 발생 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주 인플루엔자 표본감시(전국 200개 표본감시기관) 결과, 의사환자분율은 외래환자 1,000명당 1.8명으로 지난주(2.3명) 대비 감소

※ 2019-2020절기 유행기준은 잠정치 5.9명(/1,000)

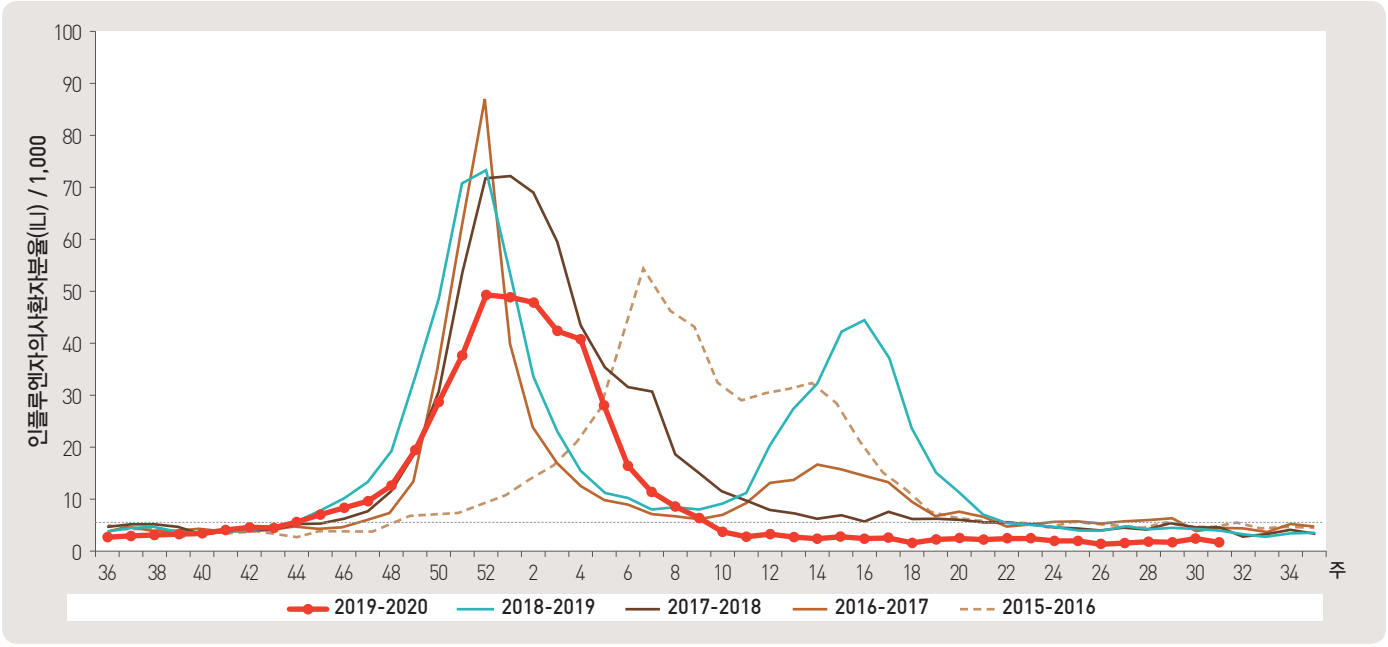


그림 1. 외래 환자 1,000명당 인플루엔자 의사환자 발생 현황

2. 수족구 발생 주간 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주차 수족구병 표본감시(전국 97개 의료기관) 결과, 의사환자 분율은 외래환자 1,000명당 1.2명으로 전주 1.4명 대비 감소

※ 수족구병은 2009년 6월 법정감염병으로 지정되어 표본감시체계로 운영

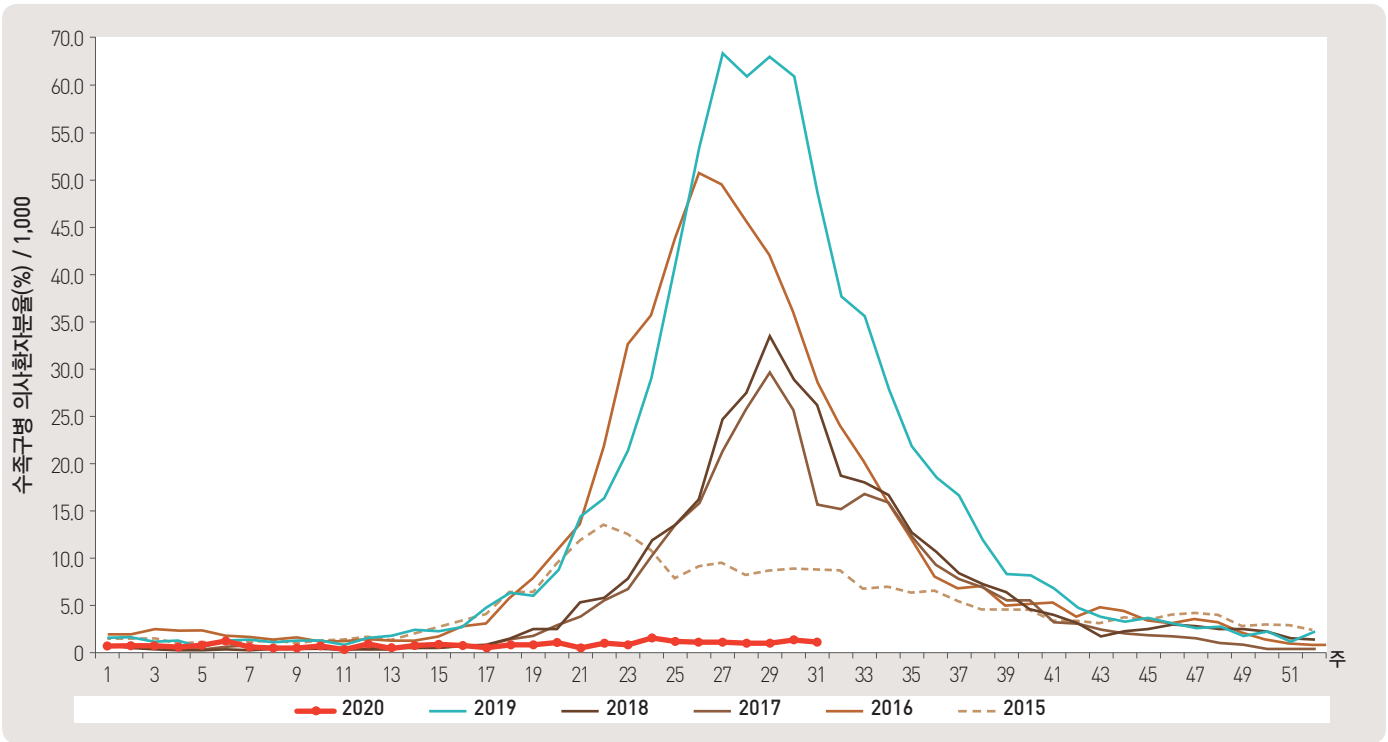


그림 2. 외래 환자 1,000명당 수족구 발생 현황

3. 안과 감염병 주간 발생 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주차 유행성각결막염 표본감시(전국 90개 의료기관) 결과, 외래환자 1,000명당 분율은 8.9명으로 전주 9.2명 대비 감소
- 동기간 급성출혈성결막염의 환자 분율은 0.5명으로 전주 0.3명 대비 증가

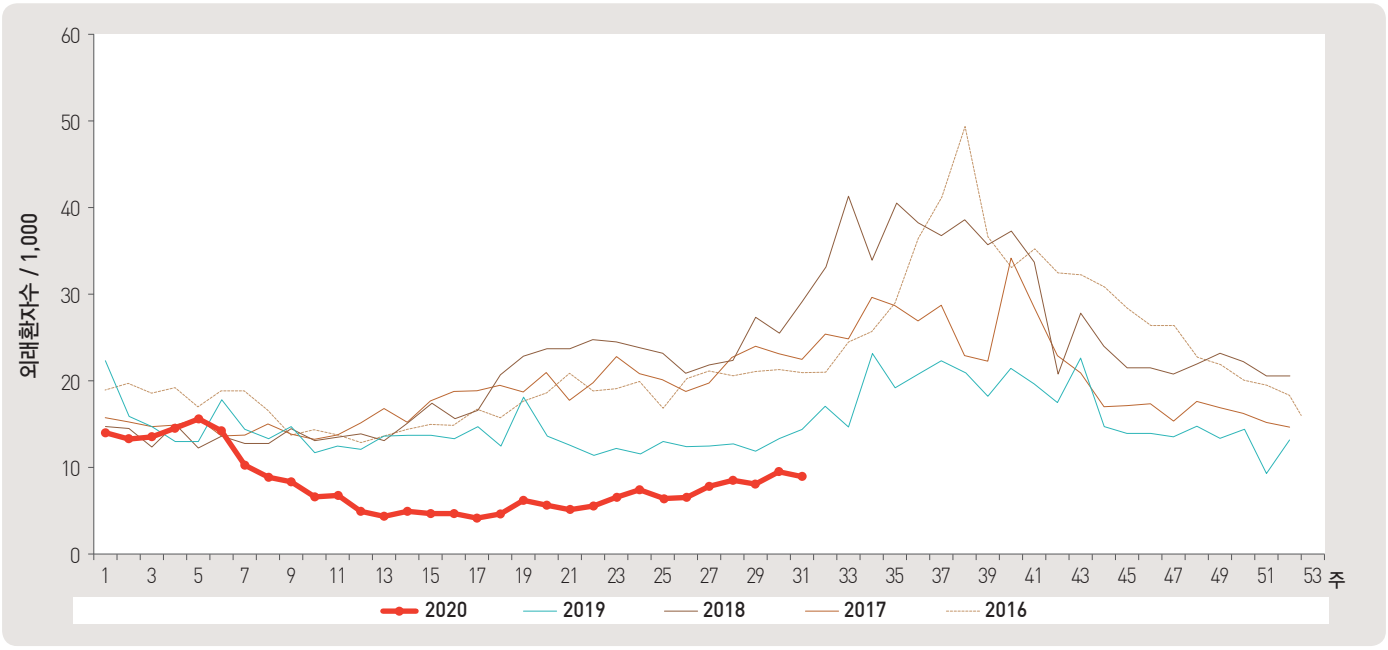


그림 3. 외래 환자 1,000명당 유행성각결막염 발생 현황

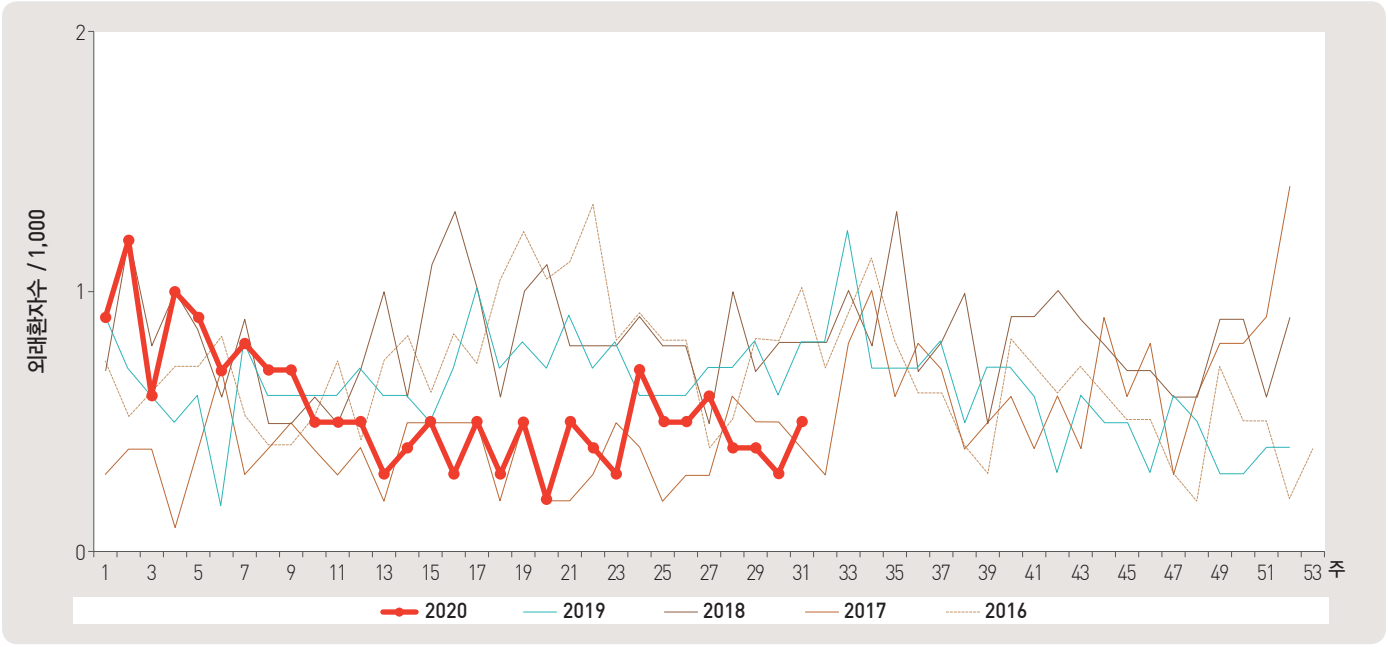


그림 4. 외래 환자 1,000명당 급성출혈성결막염 발생 현황

4. 성매개감염병 주간 발생 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주 성매개감염병 표본감시기관(전국 보건소 및 의료기관 590개 참여)에서 신고기관 당 사람유두종바이러스 감염증 4.1건, 첨규콘딜롬 2.5건, 클라미디아감염증 2.1건, 성기단순포진 1.8건, 임질 1.2건, 1기 매독 1.0건, 2기 매독 0.0건, 선천성 매독 0.0건 발생을 신고함.

* 제31주차 신고의료기관 수 : 임질 12개, 클라미디아감염증 28개, 성기단순포진 37개, 첨규콘딜롬 19개, 사람유두종바이러스 감염증 26개, 1기 매독 1개, 2기 매독 0개, 선천성 매독 0개
** 2020.1.1. 일부터 사람유두종바이러스 감염증이 표본감시에 신설되었으며, 매독이 전수감시에서 표본감시로 변경됨

단위 : 신고수/신고기관 수

임질			클라미디아 감염증			성기단순포진			첨규콘딜롬		
금주	2020년 누적	최근 5년 누적 평균§	금주	2020년 누적	최근 5년 누적 평균§	금주	2020년 누적	최근 5년 누적 평균§	금주	2020년 누적	최근 5년 누적 평균§
1.2	6.7	6.8	2.1	19.5	14.5	1.8	28.1	15.5	2.5	17.3	15.8

사람유두종바이러스감염증			매독								
			1기			2기			선천성		
금주	2020년 누적	최근 5년 누적 평균§	금주	2020년 누적	최근 5년 누적 평균§	금주	2020년 누적	최근 5년 누적 평균§	금주	2020년 누적	최근 5년 누적 평균§
4.1	53.1	53.1	1.0	2.9	2.9	0.0	3.0	3.0	0.0	2.5	2.5

누계 : 매년 첫 주부터 금주까지의 보고 누계
† 각 질병별로 규정된 신고 범위(환자, 의사환자, 병원체보유자)의 모든 신고 건을 포함
§ 최근 5년 누적 평균(Cum. 5-year average) : 최근 5년 5주차부터 금주까지 누적 환자 수 평균

1.3 수인성 및 식품매개 감염병 집단발생 주간 현황 (31주차)

▣ 수인성 및 식품매개 감염병 집단발생 주간 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주에 집단발생이 4건(사례수 130명)이 발생하였으며 누적발생건수는 135건(사례수 1,695명)이 발생함.

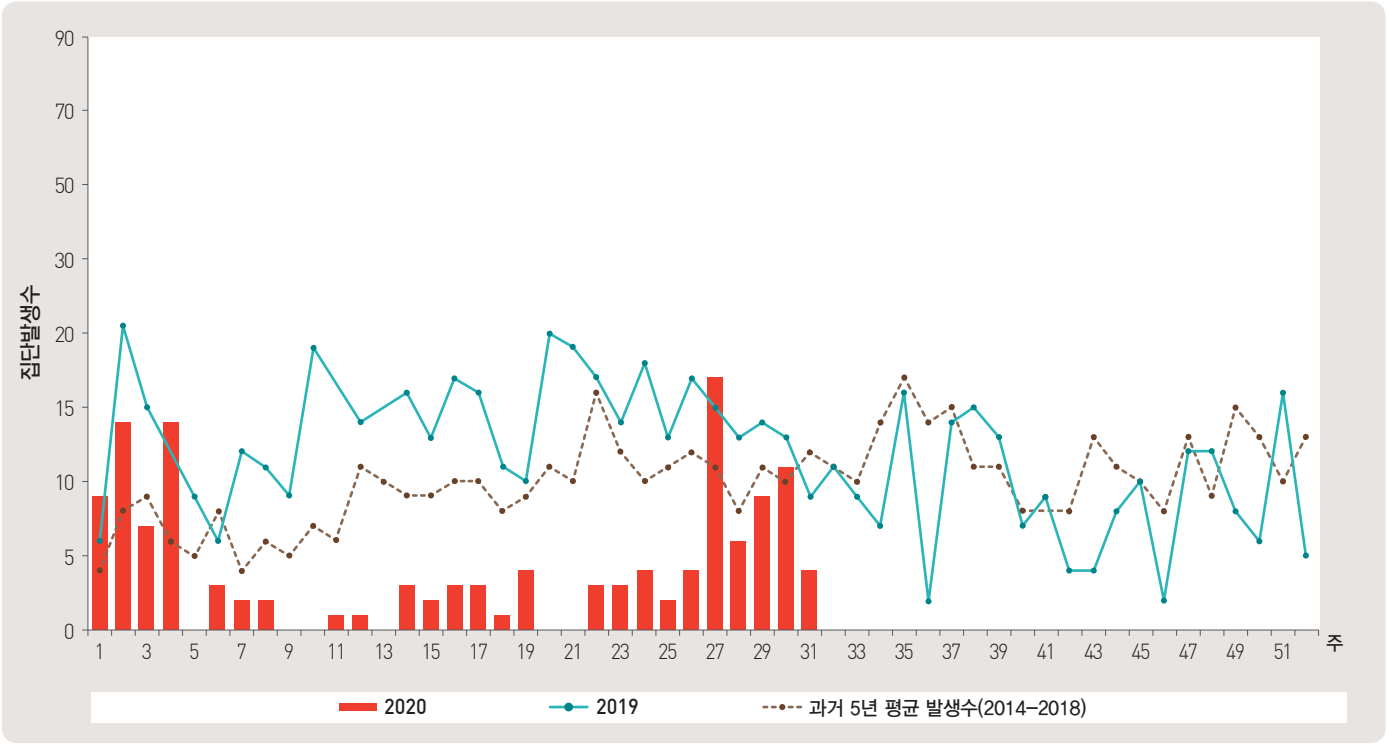


그림 5. 수인성 및 식품매개 감염병 집단발생 현황

2.1 병원체감시 : 인플루엔자 및 호흡기바이러스 주간 감시 현황(31주차)

1. 인플루엔자 바이러스 주간 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주에 전국 52개 감시사업 참여의료기관에서 의뢰된 호흡기검체 69건 중 양성 없음.

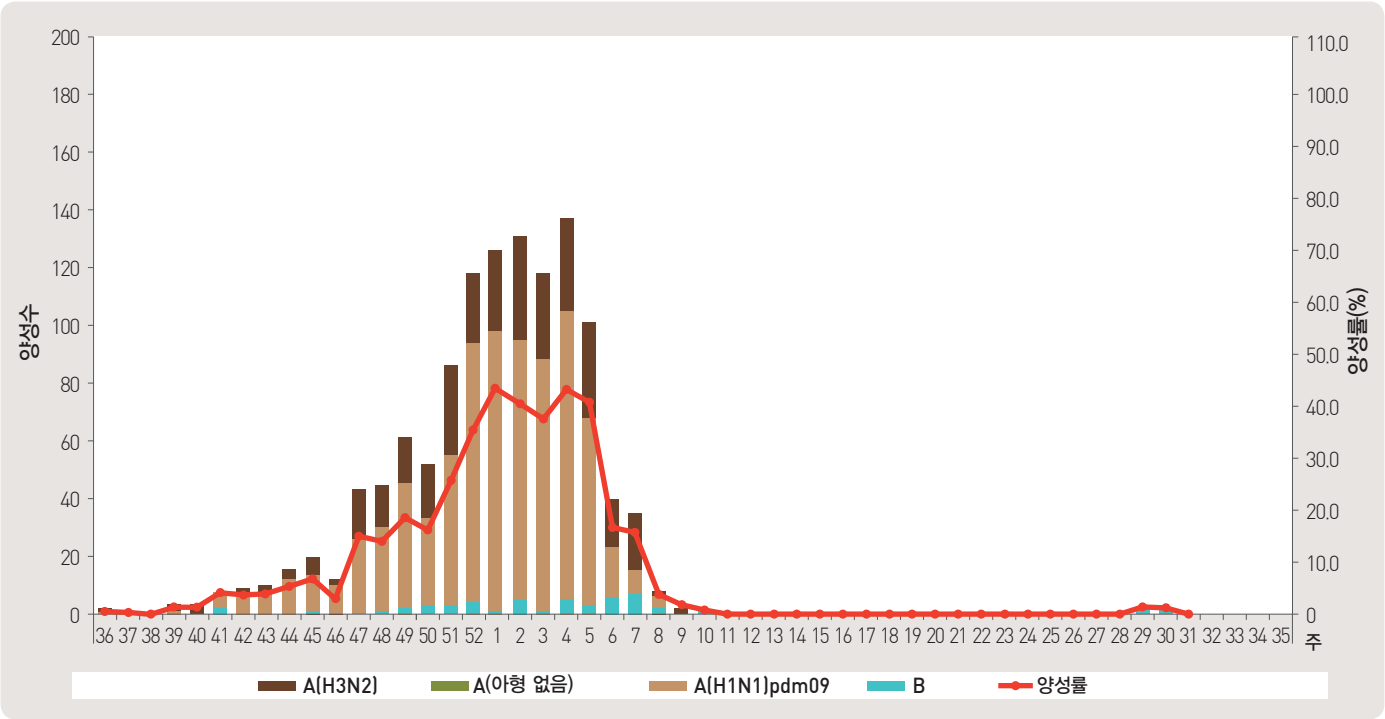


그림 6. 인플루엔자 바이러스 검출 현황

2. 호흡기 바이러스 주간 현황(31주차, 2020. 8. 1. 기준)

- 2020년도 제31주 호흡기 검체에 대한 유전자 검사결과 65.2%의 호흡기 바이러스가 검출되었음.
  (최근 4주 평균 71개의 호흡기 검체에 대한 유전자 검사결과를 나타내고 있음)

※ 주별통계는 잠정통계이므로 변동가능

2020 (주)	주별		검출률 (%)							
	검체 건수	검출률 (%)	아데노 바이러스	파라 인플루엔자 바이러스	호흡기 세포융합 바이러스	인플루엔자 바이러스	코로나 바이러스	리노 바이러스	보카 바이러스	메타뉴모 바이러스
28	63	46.0	4.8	0.0	0.0	0.0	0.0	38.1	3.2	0.0
29	71	53.5	1.4	0.0	0.0	1.4	0.0	50.7	0.0	0.0
30	80	46.3	6.3	0.0	0.0	1.3	0.0	32.5	6.3	0.0
31	69	65.2	13.0	0.0	0.0	0.0	0.0	43.5	8.7	0.0
Cum.※	283	52.7	6.4	0.0	0.0	0.7	0.0	41.0	4.6	0.0
2019 Cum.∀	12,151	60.2	8.0	6.4	3.9	14.0	2.9	17.2	2.8	5.0

※ 4주 누적 : 2020년 7월 5일 – 2020년 8월 1일 검출률임(지난 4주간 평균 71개의 검체에서 검출된 수의 평균).
∀ 2019년 누적 : 2018년 12월 30일 – 2019년 12월 28일 검출률임.

▶ 자세히 보기 : 질병관리본부 → 질병·건강 → 주간 질병감시정보

2.2 병원체감시 : 급성설사질환 바이러스 및 세균 주간 감시 현황 (30주차)

▣ 급성설사질환 바이러스 및 세균 주간 검출 현황(30주차, 2020. 7. 25. 기준)

- 2019년도 제30주 실험실 표본감시(17개 시·도 보건환경연구원 및 70개 의료기관) 급성설사질환 유발 바이러스 검출 건수는 1건(2.2%), 세균 검출 건수는 25건(20.8%) 이었음.

◆ 급성설사질환 바이러스

주		검체수	검출 건수(검출률, %)					
			노로바이러스	그룹 A 로타바이러스	장내 아데노바이러스	아스트로바이러스	사포바이러스	합계
2020	27	54	5 (9.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (9.3)
	28	41	0 (0.0)	0 (0.0)	1 (2.4)	0 (0.0)	0 (0.0)	1 (2.4)
	29	56	2 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.6)
	30	46	1 (2.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.2)
2020년 누적		1,267	207 (16.3)	32 (2.5)	12 (0.9)	15 (1.2)	4 (0.3)	270 (21.3)

* 검체는 5세 이하 아동의 급성설사 질환자에게서 수집됨.

◆ 급성설사질환 세균

주		검체수	분리 건수(분리율, %)								
			살모넬라균	병원성 대장균	세균성 이질균	장염 비브리오균	비브리오 콜레라균	캄필로 박터균	클라스트리듐 퍼프린젠스	황색 포도알균	바실루스 세레우스균	합계
2020	27	219	10 (4.6)	19 (8.7)	0 (0.0)	0 (0.0)	0 (0.0)	7 (3.2)	9 (4.1)	4 (1.8)	5 (2.3)	54 (24.7)
	28	178	6 (3.4)	11 (6.2)	0 (0.0)	0 (0.0)	0 (0.0)	10 (5.6)	1 (0.6)	4 (2.2)	1 (0.6)	33 (18.5)
	29	165	5 (3.0)	10 (6.1)	0 (0.0)	0 (0.0)	0 (0.0)	7 (4.2)	2 (1.2)	2 (1.2)	7 (4.2)	34 (20.6)
	30	120	2 (1.7)	11 (9.2)	0 (0.0)	0 (0.0)	0 (0.0)	9 (7.5)	1 (0.8)	0 (0.0)	2 (1.7)	25 (20.8)
2020년 누적		5,118	133 (2.6)	190 (3.7)	2 (0.04)	1 (0.02)	0 (0.0)	104 (2.0)	126 (2.5)	83 (1.6)	94 (1.8)	745 (14.6)

* 2020년 실험실 감시체계 참여기관(69개 의료기관)

▶ 자세히 보기 : 질병관리본부 → 질병·건강 → 주간 질병감시정보

2.3 병원체감시 : 엔테로바이러스 주간 감시 현황 (30주차)

▣ 엔테로바이러스 주간 검출 현황(30주차, 2020. 7. 25. 기준)

- 2020년도 제30주 실험실 표본감시(17개 시·도 보건환경연구원, 전국 59개 참여병원) 결과, 엔테로바이러스 검출률 0.0%(0건 양성/13검체), 2020년 누적 양성률 4.7%(14건 양성/299검체)임.

  – 무균성수막염 0건(2020년 누적 4건), 수족구병 및 포진성구협염 0건(2020년 누적 4건), 합병증 동반 수족구 0건(2020년 누적 0건), 기타 0건(2020년 누적 6건)임.

◆ 무균성수막염

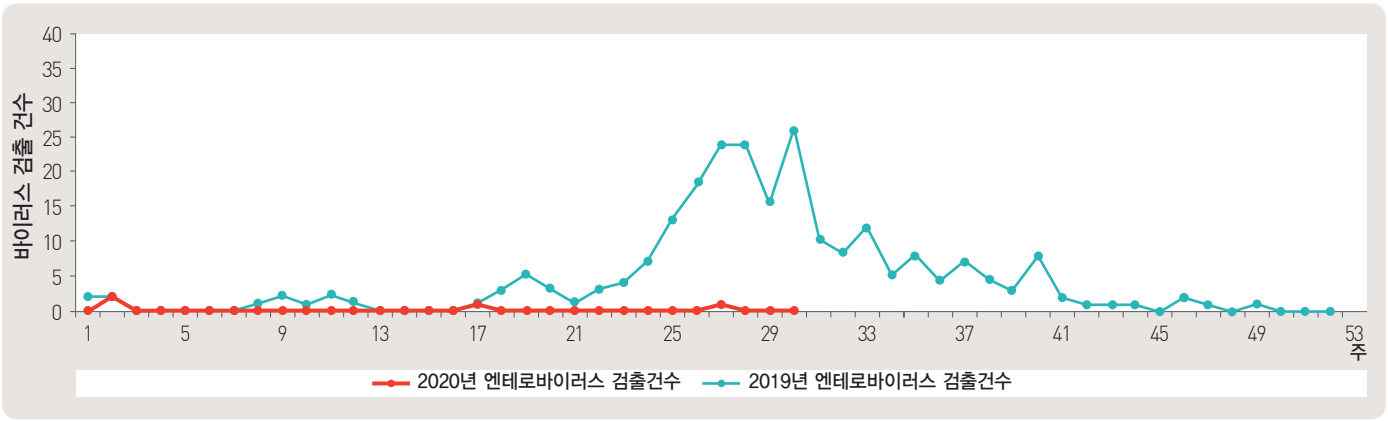


그림 7. 무균성수막염 바이러스 검출수

◆ 수족구병 및 포진성구협염

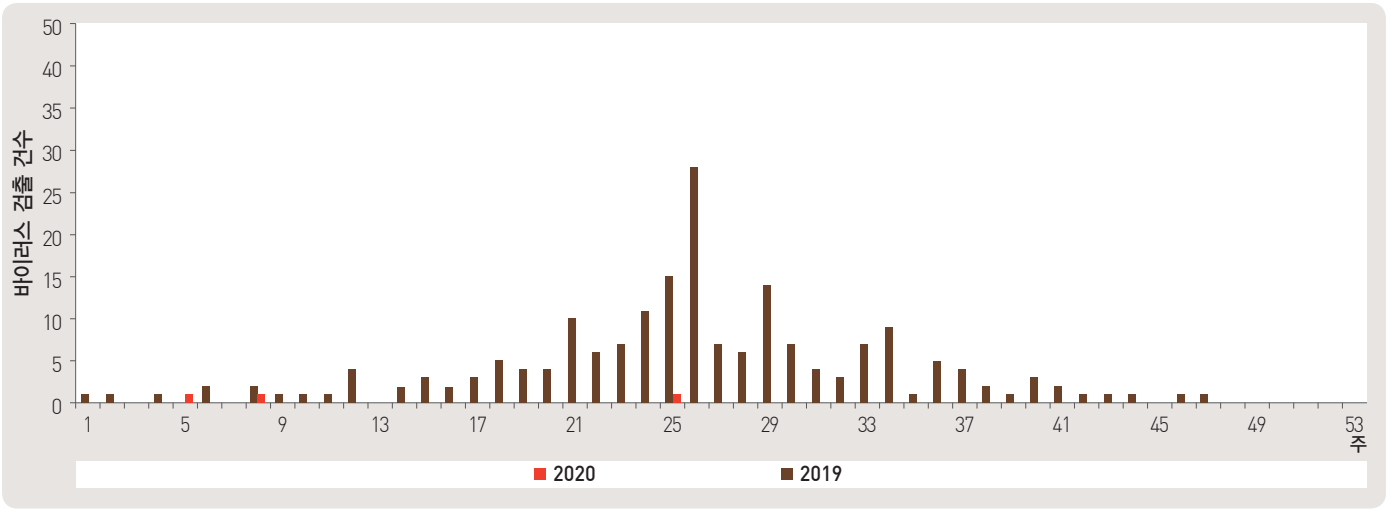


그림 8. 수족구 및 포진성구협염 바이러스 검출수

◆ 합병증 동반 수족구

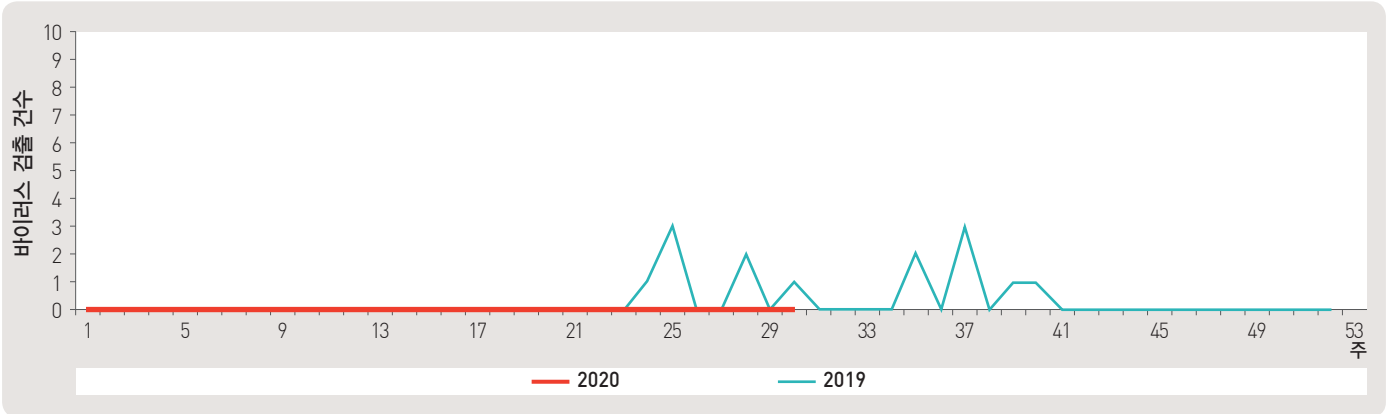


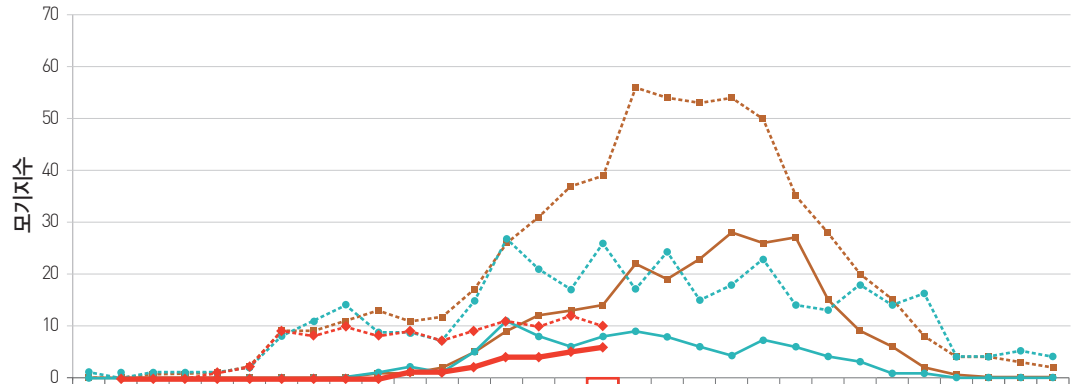
그림 9. 합병증 동반 수족구 바이러스 검출수

3.1 매개체감시 / 말라리아 매개모기 주간 감시현황 (30주차)

▣ 말라리아 매개모기 주간 검출 현황(30주차, 2020. 7. 25. 기준)

- 2020년도 제30주 말라리아 매개모기 주간 발생현황(3개 시·도, 총 51개 채집지점)
  - 전체모기 : 평균 10개체로 평년 39개체 대비 29개체(74.4%) 감소, 전년 26개체 대비 16개체(61.5%) 감소
  - 말라리아 매개모기 : 평균 6개체로 평년 14개체 대비 8개체(57.1%) 감소, 전년 8개체 대비 2개체(25.0%) 감소

※ 모기수 산출법 : 1주일간 유문등에 채집된 모기의 평균수(개체수/트랩/일)



주	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
평년 전체 모기수(평균)	0	1	1	1	1	2	9	9	11	13	11	12	17	26	31	37	39	56	54	53	54	50	35	28	20	15	8	4	4	3	2
평년 말라리아 매개모기수(평균)	0	0	0	0	0	0	0	0	0	1	1	2	5	9	12	13	14	22	19	23	28	26	27	15	9	6	3	1	0	0	0
2019 전체 모기수	0	0	1	2	2	2	8	11	14	9	9	7	15	27	21	17	26	17	24	15	18	23	14	13	18	14	16	4	4	5	4
2019 말라리아 매개모기수(평균)	0	0	0	0	0	0	0	0	0	1	2	1	5	11	8	6	8	9	8	6	5	7	6	4	3	1	1	0	0	0	0
2020 전체 모기수		0	0	0	1	2	9	7	10	8	9	7	9	11	10	12	10														
2020 말라리아 매개모기수(평균)		0	0	0	0	0	0	0	0	0	1	1	2	4	4	5	6														

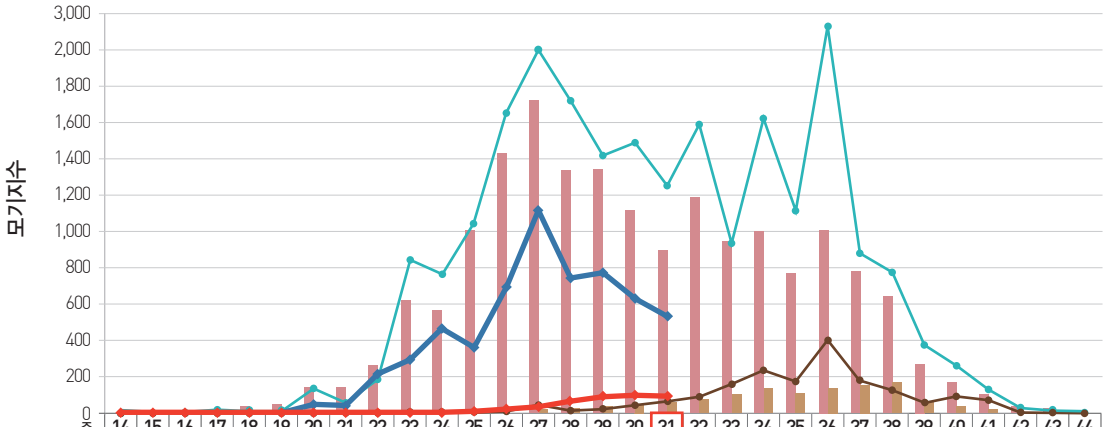
그림 10. 말라리아 매개모기 검출수

3.2 매개체감시 / 일본뇌염 매개모기 주간 감시현황 (31주차)

▣ 일본뇌염 매개모기 주간 검출 현황(31주차, 2020. 8. 1. 기준)

- 2020년 제31주 일본뇌염 매개모기 주간 발생현황 : 9개 시·도 보건환경연구원(총 9개 지점)
  - 전체모기 수 : 평균 531개체로 평년 896개체 대비 365개체(40.7%) 감소, 전년 1,250개체 대비 719개체(57.5%) 감소
  - 일본뇌염 매개모기(Japanese encephalitis vector, JEV) : 평균 92개체로 평년 44개체 대비 48개체(109.1%) 증가, 전년 65개체 대비 27개체 (41.5%) 증가

※ 모기수 산출법 : 주 2회 유문등에 채집된 모기의 평균수(개체수/트랩/일)



주	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
전체 모기수(평균)	2	2	2	7	40	49	142	137	261	623	567	1003	1430	1719	1338	1344	1114	896	1187	946	1040	767	1060	778	642	271	166	123	26	22	10
일본뇌염 매개모기수(평균)	0	0	0	0	0	1	0	0	0	1	1	4	8	24	20	30	41	44	60	109	160	126	182	164	172	58	43	33	4	3	1
2019 전체 모기수	1	2	2	7	2	6	135	56	186	843	761	1042	1647	1956	1719	1417	1491	1250	1589	945	1617	1160	2648	881	775	376	261	132	30	20	5
2019 일본뇌염 매개모기수(평균)	0	0	0	0	0	0	0	1	1	1	3	6	17	45	23	33	43	65	96	161	235	173	404	178	123	59	91	68	6	4	1
2020 전체 모기수	0	1	1	2	3	9	49	41	218	292	468	361	694	1103	745	777	630	531													
2020 일본뇌염 매개모기수(평균)	0	0	0	1	0	0	1	0	0	0	2	10	24	37	61	92	99	92													

그림 11. 일본뇌염 매개모기 검출수

▶ 자세히 보기 : 질병관리본부 → 민원·정보공개 → 사전정보공개

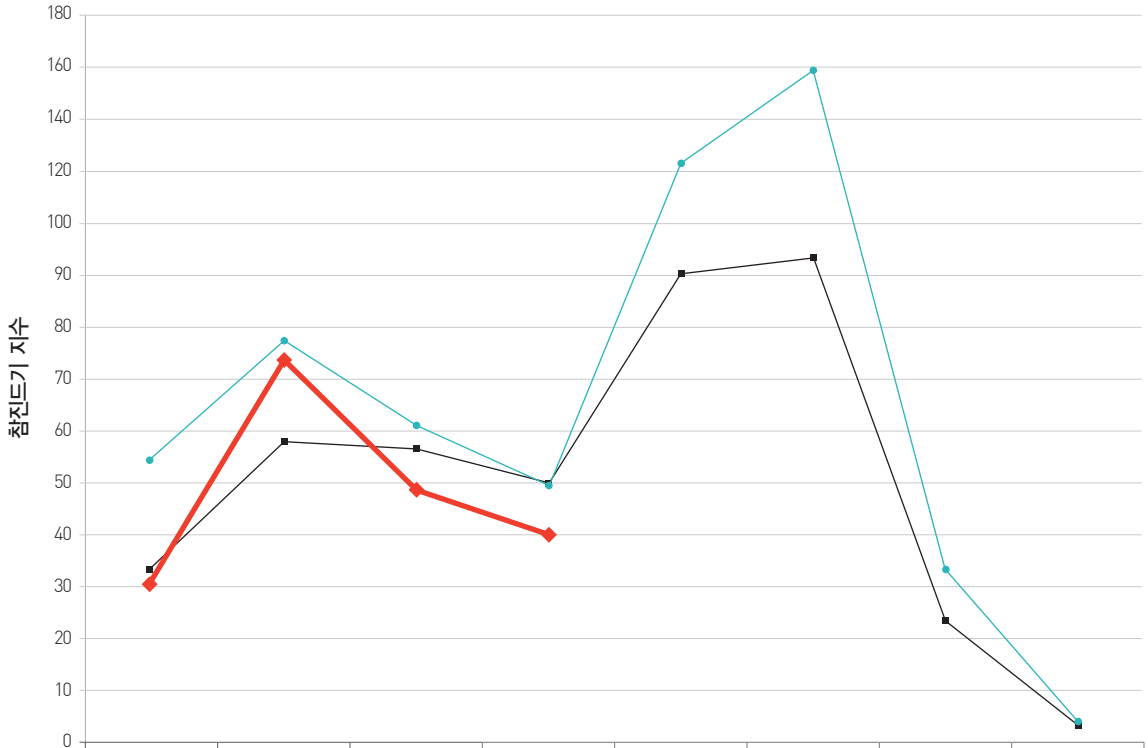
3.3 매개체감시 / 중증열성혈소판감소증후군(SFTS) 매개 참진드기 월간 감시현황 (30주차)

▣ 중증열성혈소판감소증후군 매개 참진드기 월간 발생 현황(30주차, 2020. 7. 25. 기준)

- 2020년 7월 중증열성혈소판감소증후군(SFTS) 매개 참진드기 월간 발생현황 : 11개 시·도(총 16개 지점)
  - SFTS 매개 참진드기 : 참진드기 지수(T.I.)가 36.3으로 5년 평균(2015~2019) 동기간(49.9) 대비 27.3% 낮은 수준이며, 전년(2019) 동기간(49.5) 대비 26.7% 낮은 수준임.

*T.I.: Trap index (No. of chigger/trap)

※ 참진드기 산출법 : 1일간 트랩에 채집된 참진드기의 평균수(개체수/트랩/일)



월	4월	5월	6월	7월	8월	9월	10월	11월
2015-2019 참진드기 지수(평균)	33.2	58.0	56.7	49.9	90.4	93.5	23.6	3.1
2019 참진드기 지수	54.4	77.5	61.2	49.5	123.0	158.9	33.5	4.0
2020 참진드기 지수	30.4	74.8	48.7	36.3				

그림 12. 중증열성혈소판감소증후군 매개 참진드기 발생 수

▶ 자세히 보기 : 질병관리본부 → 민원·정보공개 → 사전정보공개

주요 통계 이해하기

〈통계표 1〉은 지난 5년간 발생한 법정감염병과 2018년 해당 주 발생현황을 비교한 표로, **금주 환자 수(Current week)는 2018년 해당 주의 신고건수**를 나타내며, **2018년 누계 환자수(Cum. 2018)는 2018년 1주부터 해당 주까지의 누계 건수**, 그리고 **5년 주 평균 환자수(5-year weekly average)는 지난 5년(2013-2017년) 해당 주의 신고건수와 이전 2주, 이후 2주의 신고건수(총 29주) 평균으로 계산된다.** 그러므로 금주 환자수(Current week)와 5년 주 평균 환자수(5-year weekly average)의 신고건수를 비교하면 해당 주 단위 시점과 예년의 신고 수준을 비교해 볼 수 있다. 연도별 환자수(Total no. of cases by year)는 지난 5년간 해당 감염병 현황을 나타내는 확정 통계이며 연도별 현황을 비교해 볼 수 있다.

예) 2018년 12주의 5년 주 평균 환자수(5-year weekly average)는 2013년부터 2017년의 10주부터 28주까지의 신고 건수를 총 29주로 나눈 값으로 구해진다.

* 5년 주 평균 환자수(5-year weekly average)=(X1 + X2 + ⋯ + X25)/25

	10주	12주	12주 해당 주	14주	28주
2018년					
2017년	**X1**	**X2**	**X3**	**X4**	**X5**
2016년	**X6**	X7	X8	X9	X10
2015년	**X11**	X12	X13	X14	X15
2014년	**X16**	X17	X18	X19	X20
2013년	**X21**	X22	X23	X24	X25

〈통계표 2〉는 17개 시·도 별로 구분한 법정감염병 보고 현황을 보여 주고 있으며, 각 감염병별로 최근 5년 누계 평균 환자수(Cum, 5-year average)와 2018년 누계 환자수(Cum, 2018)를 비교해 보면 최근까지의 누적 신고건수에 대한 이전 5년 동안 해당 주까지의 평균 신고건수와 비교가 가능하다. 최근 5년 누계 평균 환자수(Cum, 5-year average)는 지난 5년(2013-2017년) 동안의 동기간 신고 누계 평균으로 계산된다.

기타 표본감시 감염병에 대한 신고현황 그림과 통계는 최근 발생양상을 신속하게 파악하는데 도움이 된다.

Statistics of selected infectious diseases

Table 1. Reported cases of national infectious diseases in Republic of Korea, week ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Classification of disease ‡	Current week	Cum. 2020	5-year weekly average	Total no. of cases by year					Imported cases of current week : Country (no. of cases)
				2019	2018	2017	2016	2015	
Category Ⅱ									
Tuberculosis	460	12,329	554	23,821	26,433	28,161	30,892	32,181	
Varicella	362	23,328	1,025	82,868	96,467	80,092	54,060	46,330	
Measles	0	7	0	194	15	7	18	7	
Cholera	0	0	0	1	2	5	4	0	
Typhoid fever	4	70	2	94	213	128	121	121	
Paratyphoid fever	2	100	1	55	47	73	56	44	
Shigellosis	0	42	3	151	191	112	113	88	
EHEC	8	271	5	146	121	138	104	71	
Viral hepatitis A	59	2,166	158	17,598	2,437	4,419	4,679	1,804	
Pertussis	1	115	14	496	980	318	129	205	
Mumps	202	6,742	300	15,967	19,237	16,924	17,057	23,448	
Rubella	0	2	0	8	0	7	11	11	
Meningococcal disease	0	6	0	16	14	17	6	6	
Pneumococcal disease	2	248	5	526	670	523	441	228	
Hansen's disease	0	3	0	4					
Scarlet fever	20	1,958	168	7,562	15,777	22,838	11,911	7,002	
VRSA	0	1	–	3	0	0	–	–	
CRE	222	9,142	–	15,369	11,954	5,717	–	–	
Viral hepatitis E	5	19	–	–	–	–	–	–	
Category Ⅲ									
Tetanus	0	22	1	31	31	34	24	22	
Viral hepatitis B	7	211	6	389	392	391	359	155	
Japanese encephalitis	0	0	0	34	17	9	28	40	
Viral hepatitis C	140	6,958	207	9,810	10,811	6,396	–	–	
Malaria	10	201	30	559	576	515	673	699	
Legionellosis	4	205	6	501	305	198	128	45	
Vibrio vulnificus sepsis	2	15	2	42	47	46	56	37	
Murine typhus	2	9	0	14	16	18	18	15	
Scrub typhus	13	376	27	4,005	6,668	10,528	11,105	9,513	
Leptospirosis	2	37	2	138	118	103	117	104	
Brucellosis	0	5	0	1	5	6	4	5	
HFRS	4	86	7	399	433	531	575	384	
HIV/AIDS	16	456	17	1,005	989	1,008	1,060	1,018	
CJD	1	56	1	53	53	36	42	33	
Dengue fever	0	43	6	273	159	171	313	255	
Q fever	3	48	2	162	163	96	81	27	
Lyme Borreliosis	0	5	1	23	23	31	27	9	
Melioidosis	0	1	0	8	2	2	4	4	
Chikungunya fever	0	0	0	16	3	5	10	2	
SFTS	4	89	8	223	259	272	165	79	
Zika virus infection	0	0	–	3	3	11	16	–	

Abbreviation: EHEC= Enterohemorrhagic Escherichia coli, VRSA= Vancomycin-resistant Staphylococcus aureus, CRE= Carbapenem-resistant Enterobacteriaceae, HFRS= Hemorrhagic fever with renal syndrome, CJD= Creutzfeldt-Jacob Disease, SFTS= Severe fever with thrombocytopenia syndrome.
Cum: Cumulative counts from 1st week to current week in a year.
* The reported data for year 2020 are provisional but the data from 2015 to 2019 are finalized data.
† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.
‡ The reported surveillance data excluded no incidence data such as Ebola virus disease, Marburg Hemorrhagic fever, Lassa fever, Crimean Congo Hemorrhagic fever, South American Hemorrhagic fever, Rift Valley fever, Smallpox, Plague, Anthrax, Botulism, Tularemia, Newly emerging infectious disease syndrome, Severe Acute Respiratory Syndrome, Middle East Respiratory Syndrome, Human infection with zoonotic influenza, Novel Influenza, Diphtheria, Poliomyelitis, Haemophilus influenza type b, Epidemic typhus, Rabies, Yellow fever, West Nile fever and Tick-borne Encephalitis.

Table 2. Reported cases of infectious diseases by geography, week ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category II											
	Tuberculosis			Varicella			Measles			Cholera		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	460	12,329	17,234	362	23,328	41,879	0	7	40	0	0	0
Seoul	80	2,150	3,137	56	2,779	4,563	0	2	6	0	0	0
Busan	37	828	1,212	19	1,285	2,417	0	0	2	0	0	0
Daegu	20	587	815	22	1,135	2,270	0	0	2	0	0	0
Incheon	17	657	900	20	1,184	2,063	0	0	2	0	0	0
Gwangju	14	319	432	9	1,103	1,340	0	0	0	0	0	0
Daejeon	15	277	376	9	762	1,123	0	0	5	0	0	0
Ulsan	11	224	360	21	471	1,297	0	0	0	0	0	0
Sejong	1	49	54	6	203	11,820	0	0	14	0	0	0
Gyonggi	89	2,591	3,687	90	6,032	1,135	0	3	1	0	0	0
Gangwon	16	533	740	8	696	1,070	0	0	0	0	0	0
Chungbuk	12	370	534	4	859	1,537	0	0	1	0	0	0
Chungnam	24	642	807	11	832	1,753	0	0	1	0	0	0
Jeonbuk	28	503	674	18	936	1,723	0	0	2	0	0	0
Jeonnam	18	656	904	1	865	2,233	0	1	2	0	0	0
Gyeongbuk	39	943	1,249	18	1,269	3,990	0	0	2	0	0	0
Gyeongnam	35	829	1,140	36	2,382	1,121	0	1	0	0	0	0
Jeju	4	171	212	14	535	424	0	0	0	0	0	0

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category II											
	Typhoid fever			Paratyphoid fever			Shigellosis			Enterohemorrhagic *Escherichia coli*		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	4	70	94	2	100	30	0	42	80	8	271	68
Seoul	1	10	19	0	9	5	0	9	18	0	20	11
Busan	0	7	8	0	32	3	0	4	5	0	5	2
Daegu	0	3	3	1	13	2	0	0	4	0	5	2
Incheon	0	8	6	0	2	2	0	4	8	0	7	5
Gwangju	0	2	1	0	4	1	0	2	2	0	14	10
Daejeon	2	2	5	0	0	1	0	0	1	1	7	1
Ulsan	0	1	2	0	0	0	0	2	1	0	8	2
Sejong	0	0	21	0	0	6	0	0	16	0	0	11
Gyonggi	1	19	2	0	8	1	0	12	1	2	129	4
Gangwon	0	1	3	0	6	1	0	0	2	0	3	3
Chungbuk	0	1	4	0	1	0	0	0	5	0	3	2
Chungnam	0	3	1	0	5	2	0	2	2	0	6	1
Jeonbuk	0	1	4	1	3	2	0	0	4	0	5	4
Jeonnam	0	1	4	0	8	1	0	1	5	0	12	3
Gyeongbuk	0	4	7	0	2	2	0	2	5	3	16	3
Gyeongnam	0	7	3	0	5	1	0	4	1	2	18	3
Jeju	0	0	1	0	2	0	0	0	0	0	13	1

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category II											
	Viral hepatitis A			Pertussis			Mumps			Rubella		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	59	2,166	4,064	1	115	211	202	6,742	11,885	0	2	3
Seoul	13	404	774	0	14	27	19	854	1,217	0	0	1
Busan	3	63	149	0	6	17	18	365	753	0	1	0
Daegu	1	52	63	0	5	5	7	262	411	0	0	0
Incheon	7	231	283	1	6	13	12	358	520	0	0	0
Gwangju	3	45	71	0	10	10	8	251	628	0	0	0
Daejeon	6	95	398	0	7	4	6	183	287	0	0	0
Ulsan	2	28	29	0	2	6	6	181	403	0	0	0
Sejong	0	12	1,245	0	0	33	3	31	3,077	0	0	1
Gyonggi	10	687	73	0	17	2	71	1,975	364	0	1	0
Gangwon	2	57	197	0	0	5	6	215	262	0	0	0
Chungbuk	2	78	306	0	0	4	2	203	458	0	0	0
Chungnam	3	120	140	0	4	5	7	302	801	0	0	0
Jeonbuk	2	124	92	0	2	11	5	299	575	0	0	1
Jeonnam	1	34	72	0	20	15	2	257	585	0	0	0
Gyeongbuk	2	72	92	0	9	48	9	324	1,343	0	0	0
Gyeongnam	2	49	20	0	12	3	17	564	154	0	0	0
Jeju	0	15	60	0	1	3	4	118	47	0	0	0

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category II						Diseases of Category III					
	Meningococcal disease			Scarlet fever			Tetanus			Viral hepatitis B		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	0	6	9	20	1,958	8,621	0	22	16	7	211	199
Seoul	0	1	2	4	279	1,149	0	2	1	0	35	35
Busan	0	1	1	1	118	619	0	2	1	0	10	15
Daegu	0	0	1	0	41	308	0	1	1	0	7	6
Incheon	0	1	1	0	101	400	0	0	0	0	13	11
Gwangju	0	0	0	1	222	401	0	1	1	0	4	4
Daejeon	0	0	0	0	78	316	0	0	1	0	11	8
Ulsan	0	0	0	1	76	386	0	0	0	1	6	5
Sejong	0	0	2	0	11	2,524	0	1	1	0	2	46
Gyonggi	0	2	1	3	497	136	0	2	1	4	56	6
Gangwon	0	0	0	0	36	152	0	1	0	0	6	7
Chungbuk	0	0	0	1	24	385	0	2	1	0	5	11
Chungnam	0	0	0	1	64	290	0	5	1	0	8	11
Jeonbuk	0	0	0	1	53	326	0	3	3	1	10	10
Jeonnam	0	0	0	1	88	435	0	1	2	0	9	11
Gyeongbuk	0	1	1	0	75	654	0	1	2	0	9	11
Gyeongnam	0	0	0	4	148	94	0	0	0	1	19	2
Jeju	0	0	0	2	47	46	0	0	0	0	1	0

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category Ⅲ											
	Japanese encephalitis			Malaria			Legionellosis			*Vibrio vulnificus* sepsis		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	0	0	0	10	201	376	4	205	120	2	15	5
Seoul	0	0	0	2	45	51	0	59	33	0	4	1
Busan	0	0	0	0	2	4	1	12	8	0	0	0
Daegu	0	0	0	1	3	5	1	6	4	0	0	0
Incheon	0	0	0	4	27	51	0	10	9	0	0	0
Gwangju	0	0	0	0	4	3	0	7	2	0	0	0
Daejeon	0	0	0	0	3	2	0	3	1	0	0	0
Ulsan	0	0	0	0	3	3	0	1	2	0	0	0
Sejong	0	0	0	0	0	218	0	0	26	0	0	1
Gyonggi	0	0	0	2	89	13	0	45	5	0	2	0
Gangwon	0	0	0	1	12	3	1	3	5	0	0	0
Chungbuk	0	0	0	0	2	4	0	10	3	0	0	0
Chungnam	0	0	0	0	4	2	0	4	3	0	1	0
Jeonbuk	0	0	0	0	2	3	0	8	4	0	0	2
Jeonnam	0	0	0	0	0	4	0	10	9	1	2	0
Gyeongbuk	0	0	0	0	2	6	1	7	4	0	1	1
Gyeongnam	0	0	0	0	3	3	0	9	2	1	4	0
Jeju	0	0	0	0	0	1	0	11	0	0	1	0

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category Ⅲ											
	Murine typhus			Scrub typhus			Leptospirosis			Brucellosis		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	2	9	6	13	376	713	2	37	31	0	5	1
Seoul	0	1	1	0	5	32	0	2	1	0	1	1
Busan	0	0	0	1	22	26	0	3	1	0	0	0
Daegu	0	0	0	0	1	6	1	2	0	0	0	0
Incheon	2	7	1	0	5	14	0	1	0	0	0	0
Gwangju	0	0	1	0	4	16	0	0	1	0	0	0
Daejeon	0	0	0	1	10	17	0	4	0	0	0	0
Ulsan	0	0	0	0	11	16	0	0	1	0	0	0
Sejong	0	0	1	0	4	66	0	1	7	0	0	0
Gyonggi	0	0	0	0	28	19	0	3	2	0	0	0
Gangwon	0	0	0	0	4	13	0	1	2	0	0	0
Chungbuk	0	0	1	0	7	69	0	1	4	0	0	0
Chungnam	0	0	0	2	37	67	0	4	1	0	0	0
Jeonbuk	0	0	1	4	55	176	0	5	4	0	3	0
Jeonnam	0	0	0	1	91	47	1	6	3	0	1	0
Gyeongbuk	0	0	0	1	9	120	0	2	3	0	0	0
Gyeongnam	0	0	0	3	73	7	0	2	1	0	0	0
Jeju	0	1	0	0	10	2	0	0	0	0	0	0

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category Ⅲ											
	Hemorrhagic fever with renal syndrome			Creutzfeldt-Jacob Disease			Dengue fever			Q fever		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	4	86	165	1	56	28	0	43	112	3	48	65
Seoul	0	3	7	0	13	7	0	14	37	0	1	4
Busan	0	0	5	0	7	2	0	5	6	0	1	1
Daegu	0	2	2	0	4	1	0	2	6	0	0	2
Incheon	0	2	2	0	5	1	0	2	6	0	1	1
Gwangju	0	1	2	0	2	0	0	0	1	0	1	3
Daejeon	0	1	3	0	1	1	0	0	2	0	2	1
Ulsan	0	0	1	0	1	0	0	1	2	0	0	2
Sejong	0	0	44	0	0	6	0	0	30	0	0	9
Gyonggi	0	11	7	0	12	1	0	13	3	0	7	0
Gangwon	1	10	10	0	0	1	0	0	2	0	0	14
Chungbuk	0	4	19	0	3	1	0	0	3	0	9	9
Chungnam	0	7	14	0	1	1	0	2	2	2	6	3
Jeonbuk	1	15	24	0	2	1	0	0	3	0	3	7
Jeonnam	1	14	16	0	1	3	0	1	3	1	13	4
Gyeongbuk	1	10	8	1	1	2	0	1	4	0	0	5
Gyeongnam	0	3	1	0	3	0	0	1	2	0	4	0
Jeju	0	3	0	0	0	0	0	1	0	0	0	0

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

Table 2. *(Continued)* Reported cases of infectious diseases by geography, weeks ending August 1, 2020 (31st Week)*

Unit: No. of cases†

Reporting area	Diseases of Category Ⅳ								
	Lyme Borreliosis			Severe fever with thrombocytopenia syndrome			Zika virus infection		
	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
Overall	0	5	10	4	89	81	0	0	–
Seoul	0	2	4	0	2	2	0	0	–
Busan	0	0	0	0	0	1	0	0	–
Daegu	0	0	0	0	4	1	0	0	–
Incheon	0	0	1	0	3	1	0	0	–
Gwangju	0	0	0	0	0	0	0	0	–
Daejeon	0	0	0	0	1	1	0	0	–
Ulsan	0	0	0	0	4	1	0	0	–
Sejong	0	0	2	0	0	12	0	0	–
Gyonggi	0	0	0	0	3	12	0	0	–
Gangwon	0	2	0	2	14	2	0	0	–
Chungbuk	0	0	1	0	2	10	0	0	–
Chungnam	0	1	1	1	9	5	0	0	–
Jeonbuk	0	0	0	0	4	6	0	0	–
Jeonnam	0	0	1	0	5	11	0	0	–
Gyeongbuk	0	0	0	0	13	10	0	0	–
Gyeongnam	0	0	0	0	18	6	0	0	–
Jeju	0	0	0	1	7	0	0	0	–

Cum: Cumulative counts from 1st week to current week in a year

* The reported data for year 2019, 2020 are provisional but the data from 2014 to 2018 are finalized data.

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

1. Influenza, Republic of Korea, weeks ending August 1, 2020 (31st Week)

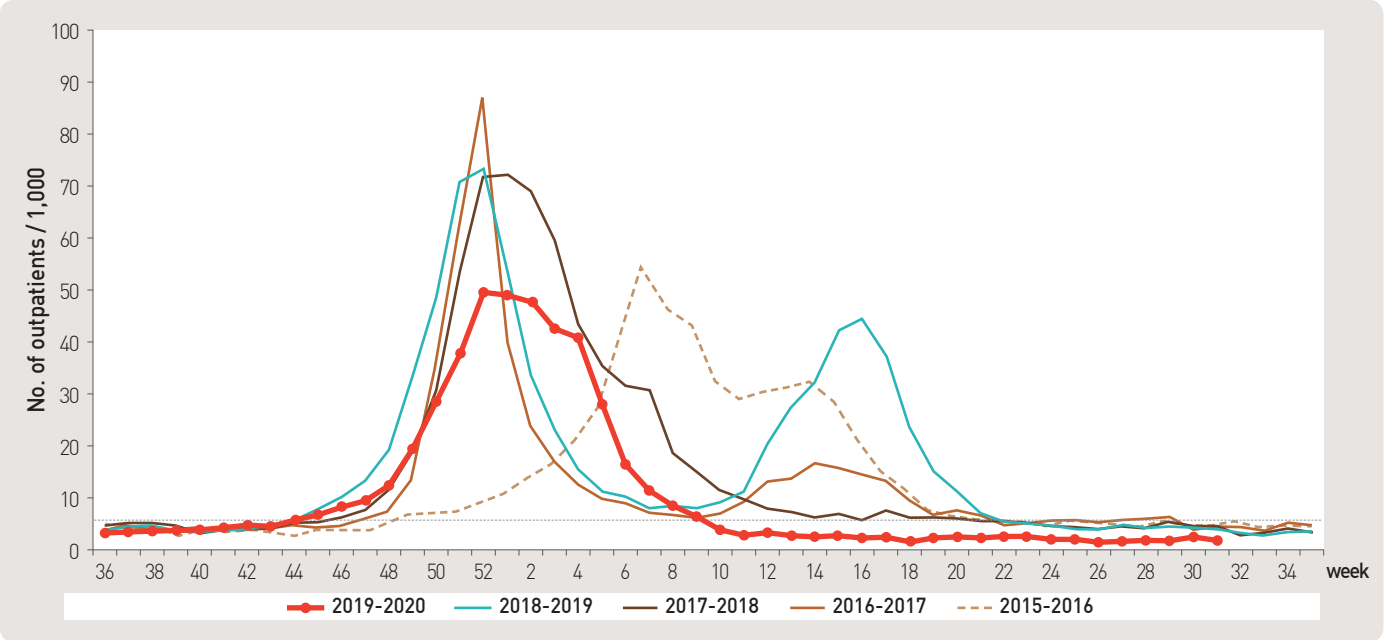


Figure 1. Weekly proportion of influenza-like illness per 1,000 outpatients, 2015-2016 to 2019-2020 flu seasons

2. Hand, Foot and Mouth Disease(HFMD), Republic of Korea, weeks ending August 1, 2020 (31st Week)

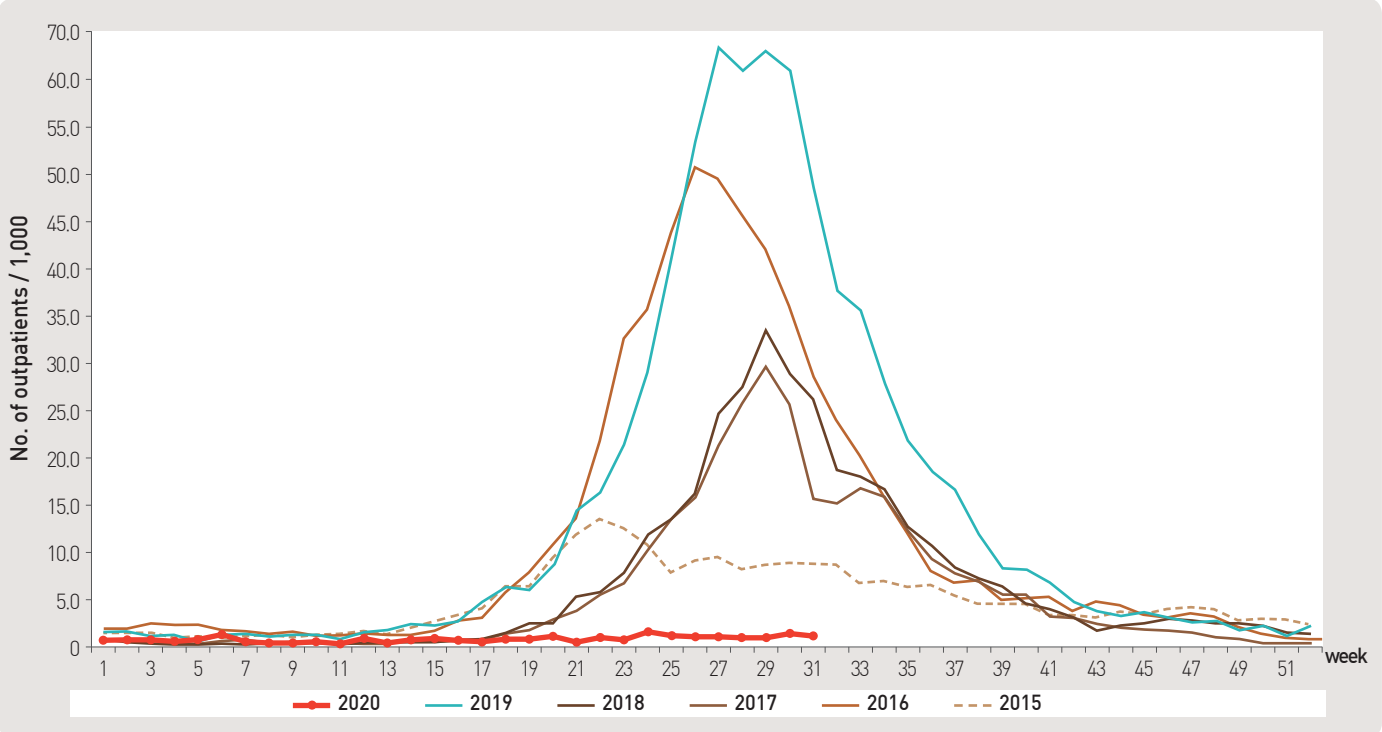


Figure 2. Weekly proportion of hand, foot and mouth disease per 1,000 outpatients, 2015-2020

3. Ophthalmologic infectious disease, Republic of Korea, weeks ending August 1, 2020 (31st Week)

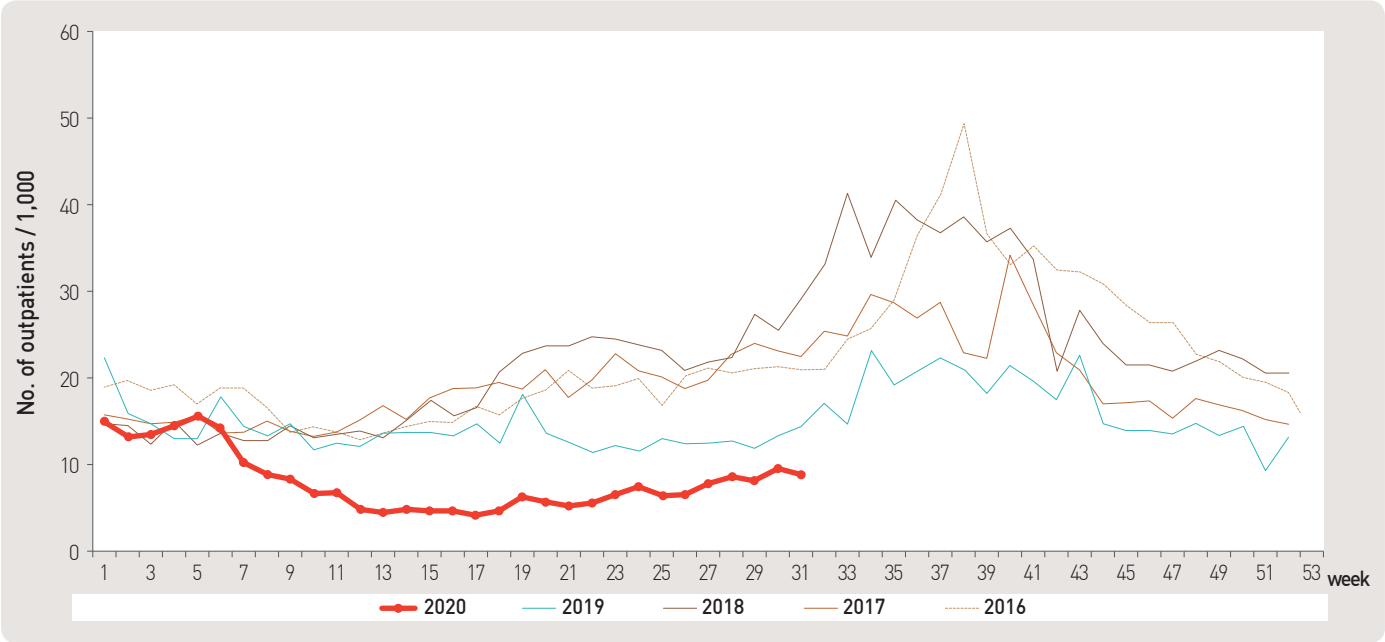


Figure 3. Weekly proportion of epidemic keratoconjunctivitis per 1,000 outpatients

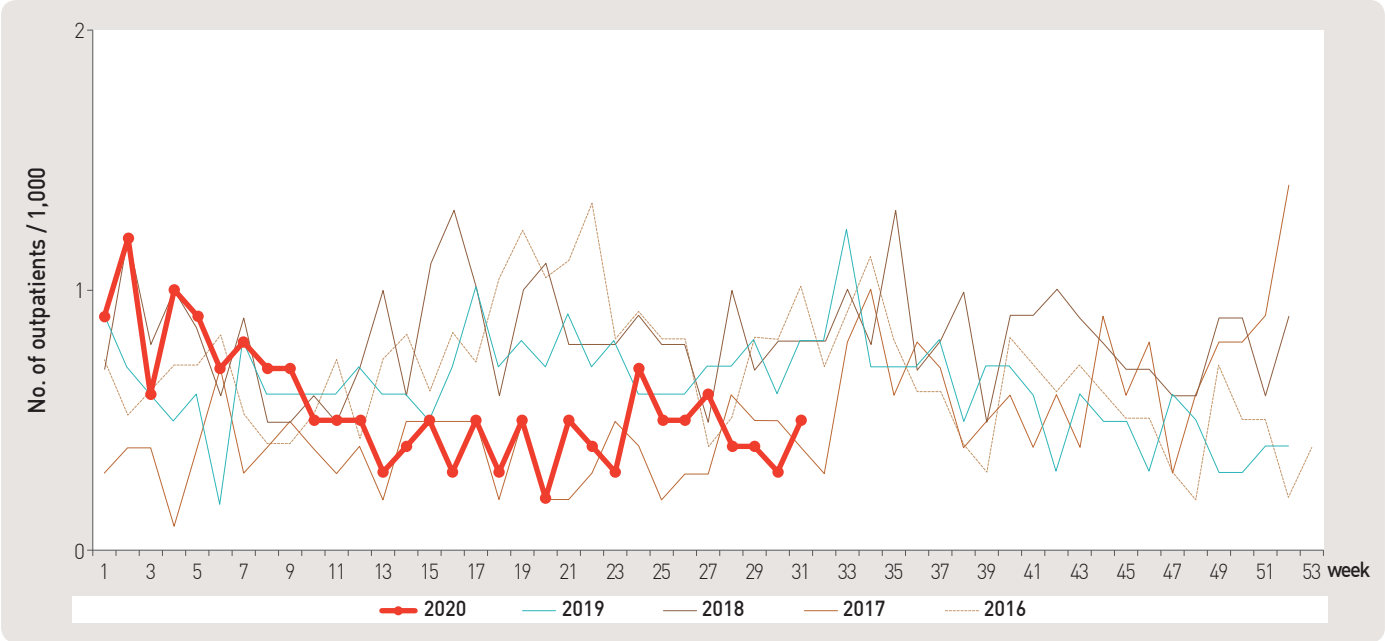


Figure 4. Weekly proportion of acute hemorrhagic conjunctivitis per 1,000 outpatients

4. Sexually Transmitted Diseases†, Republic of Korea, weeks ending August 1, 2020 (31st Week)

Unit: No. of cases/sentinels

Gonorrhea			Chlamydia			Genital herpes			Condyloma acuminata		
Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
1.2	6.7	6.8	2.1	19.5	14.5	1.8	28.1	15.5	2.5	17.3	15.8

Human Papilloma virus infection			Syphilis								
			Primary			Secondary			Congenital		
Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§	Current week	Cum. 2020	Cum. 5-year average§
4.1	53.1	53.1	1.0	2.9	2.9	0.0	3.0	3.0	0.0	2.5	2.5

Cum: Cumulative counts from 1st week to current week in a year

† According to surveillance data, the reported cases may include all of the cases such as confirmed, suspected, and asymptomatic carrier in the group.

§ Cum. 5-year average is mean value calculated by cumulative counts from 1st week to current week for 5 preceding years.

▣ Waterborne and foodborne disease outbreaks, Republic of Korea, weeks ending August 1, 2020 (31st Week)

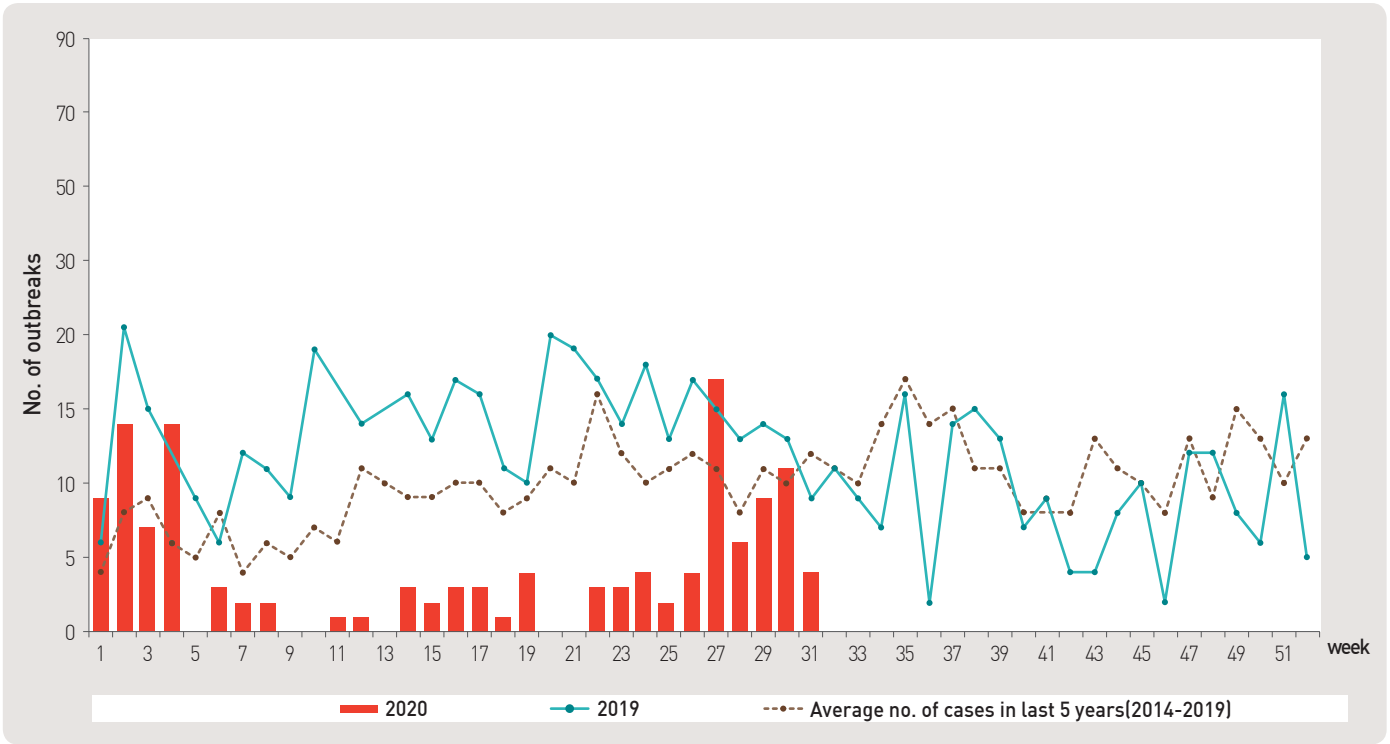


Figure 5. Number of waterborne and foodborne disease outbreaks reported by week, 2019–2020

1. Influenza viruses, Republic of Korea, weeks ending August 1, 2020 (31st Week)

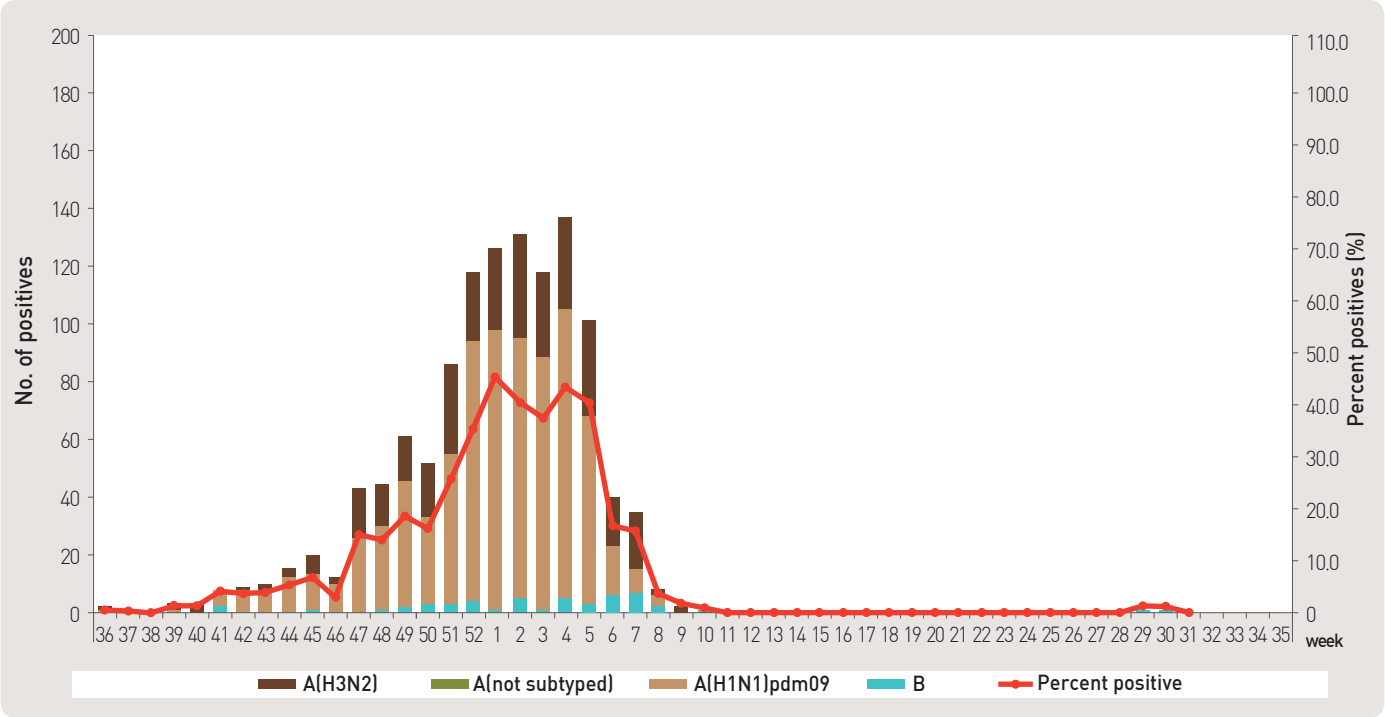


Figure 6. Number of specimens positive for influenza by subtype, 2019–2020 flu season

2. Respiratory viruses, Republic of Korea, weeks ending August 1, 2020 (31st Week)

2020 (week)	Weekly total		Detection rate (%)							
	No. of samples	Detection rate (%)	HAdV	HPIV	HRSV	IFV	HCoV	HRV	HBoV	HMPV
28	63	46.0	4.8	0.0	0.0	0.0	0.0	38.1	3.2	0.0
29	71	53.5	1.4	0.0	0.0	1.4	0.0	50.7	0.0	0.0
30	80	46.3	6.3	0.0	0.0	1.3	0.0	32.5	6.3	0.0
31	69	65.2	13.0	0.0	0.0	0.0	0.0	43.5	8.7	0.0
Cum.※	283	52.7	6.4	0.0	0.0	0.7	0.0	41.0	4.6	0.0
2019 Cum.∀	12,151	60.2	8.0	6.4	3.9	14.0	2.9	17.2	2.8	5.0

– HAdV: human Adenovirus, HPIV: human Parainfluenza virus, HRSV: human Respiratory syncytial virus, IFV: Influenza virus, HCoV: human Coronavirus, HRV: human Rhinovirus, HBoV: human Bocavirus, HMPV: human Metapneumovirus

※ Cum.: the rate of detected cases between July 5, 2020 – August 1, 2020 (Average No. of detected cases is 71 last 4 weeks)

∀ 2019 Cum.: the rate of detected cases between December 30, 2018 – December 28, 2019

▣ Acute gastroenteritis-causing viruses and bacteria, Republic of Korea, weeks ending July 25, 2020 (30th week)

◆ Acute gastroenteritis-causing viruses

Week		No. of sample	No. of detection (Detection rate, %)					
			Norovirus	Group A Rotavirus	Enteric Adenovirus	Astrovirus	Sapovirus	Total
2020	27	54	5 (9.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (9.3)
	28	41	0 (0.0)	0 (0.0)	1 (2.4)	0 (0.0)	0 (0.0)	1 (2.4)
	29	56	2 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (3.6)
	30	46	1 (2.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.2)
Cum.		1,267	207 (16.3)	32 (2.5)	12 (0.9)	15 (1.2)	4 (0.3)	270 (21.3)

* The samples were collected from children ≤5 years of sporadic acute gastroenteritis in Korea.

◆ Acute gastroenteritis-causing bacteria

Week		No. of sample	No. of isolation (Isolation rate, %)								
			Salmonella spp.	Pathogenic *E.coli*	*Shigella spp.*	*V.parahaemolyticus*	*V. cholerae*	*Campylobacter spp.*	*C.perfringens*	*S. aureus*	*B. cereus*	Total
2020	27	219	10 (4.6)	19 (8.7)	0 (0.0)	0 (0.0)	0 (0.0)	7 (3.2)	9 (4.1)	4 (1.8)	5 (2.3)	54 (24.7)
	28	178	6 (3.4)	11 (6.2)	0 (0.0)	0 (0.0)	0 (0.0)	10 (5.6)	1 (0.6)	4 (2.2)	1 (0.6)	33 (18.5)
	29	165	5 (3.0)	10 (6.1)	0 (0.0)	0 (0.0)	0 (0.0)	7 (4.2)	2 (1.2)	2 (1.2)	7 (4.2)	34 (20.6)
	30	120	2 (1.7)	11 (9.2)	0 (0.0)	0 (0.0)	0 (0.0)	9 (7.5)	1 (0.8)	0 (0.0)	2 (1.7)	25 (20.8)
Cum.		5,118	133 (2.6)	190 (3.7)	2 (0.04)	1 (0.02)	0 (0.0)	104 (2.0)	126 (2.5)	83 (1.6)	94 (1.8)	745 (14.6)

* Bacterial Pathogens: *Salmonella spp., E. coli (EHEC, ETEC, EPEC, EIEC), Shigella spp., Vibrio parahaemolyticus, Vibrio cholerae, Campylobacter spp., Clostridium perfringens, Staphylococcus aureus, Bacillus cereus, Listeria monocytogenes, Yersinia enterocolitica.*

* Hospital participating in laboratory surveillance in 2018 (70 hospitals)

† Contains 3 *Listeria monocytogenes*

▣ Enterovirus, Republic of Korea, weeks ending July 25, 2020 (30th week)

◆ Aseptic meningitis

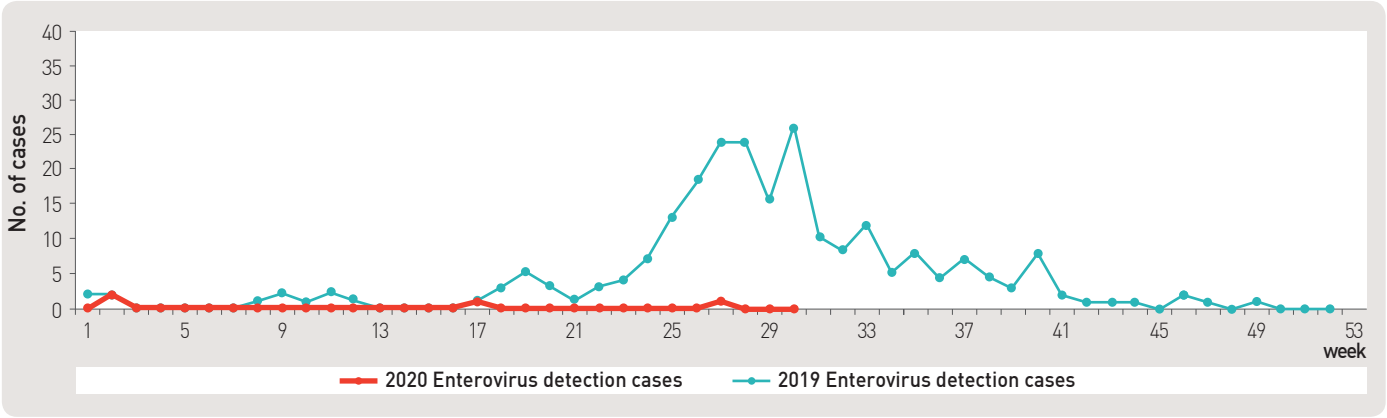


Figure 7. Detection cases of enterovirus in aseptic meningitis patients from 2019 to 2020

◆ HFMD and Herpangina

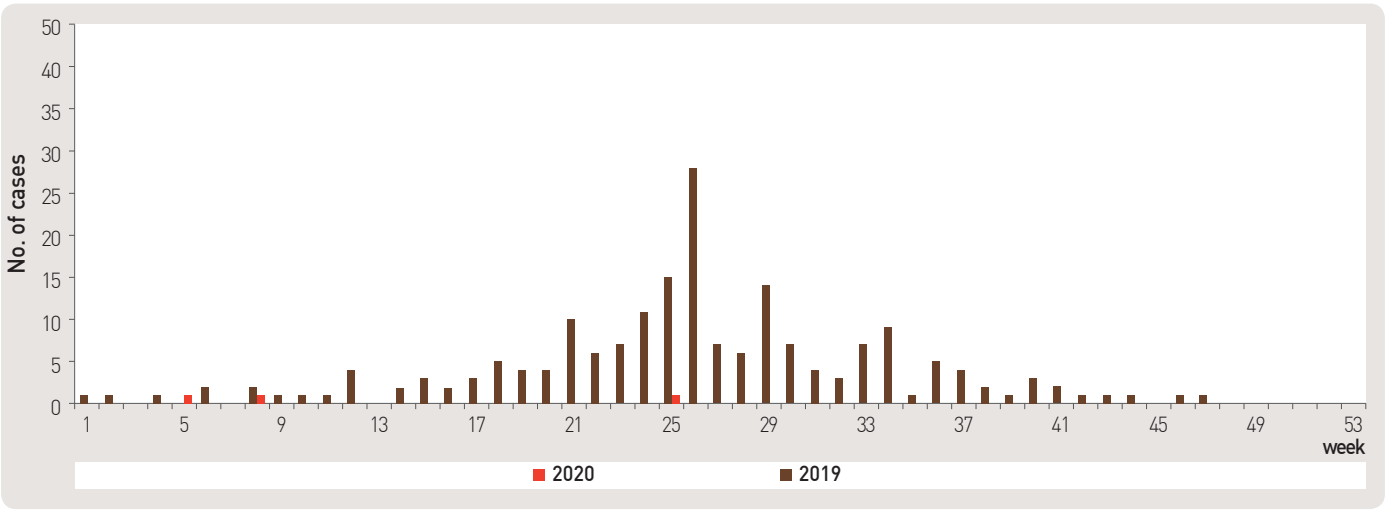


Figure 8. Detection cases of enterovirus in HFMD and herpangina patients from 2019 to 2020

◆ HFMD with Complications

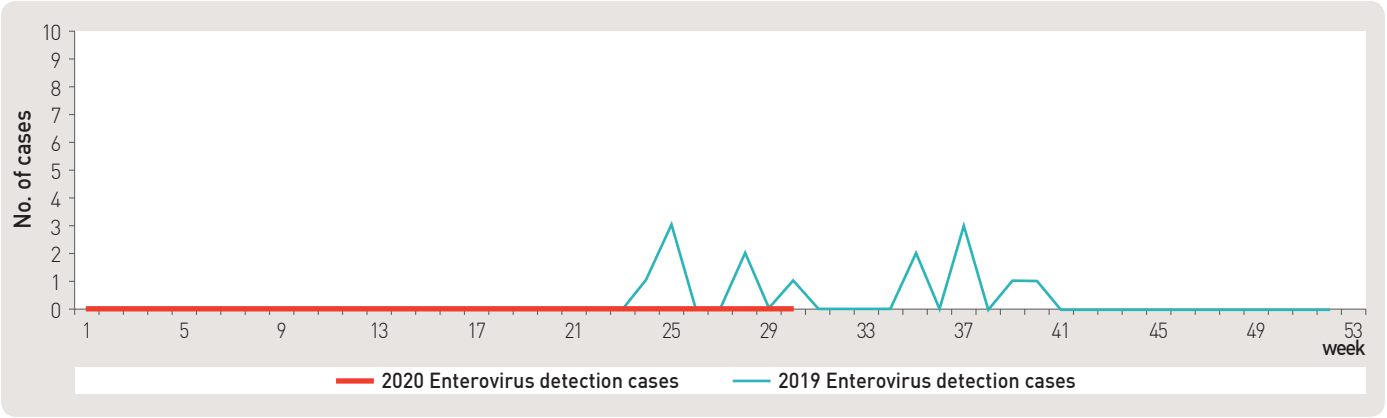
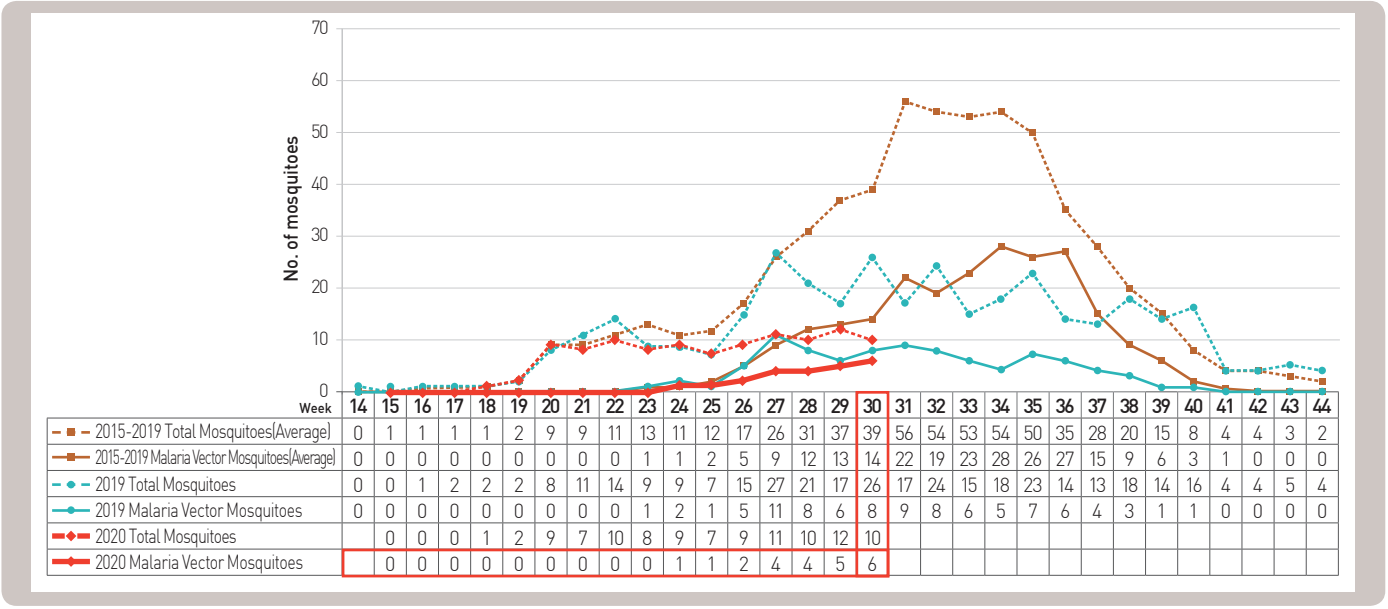


Figure 9. Detection cases of enterovirus in HFMD with complications patients from 2019 to 2020

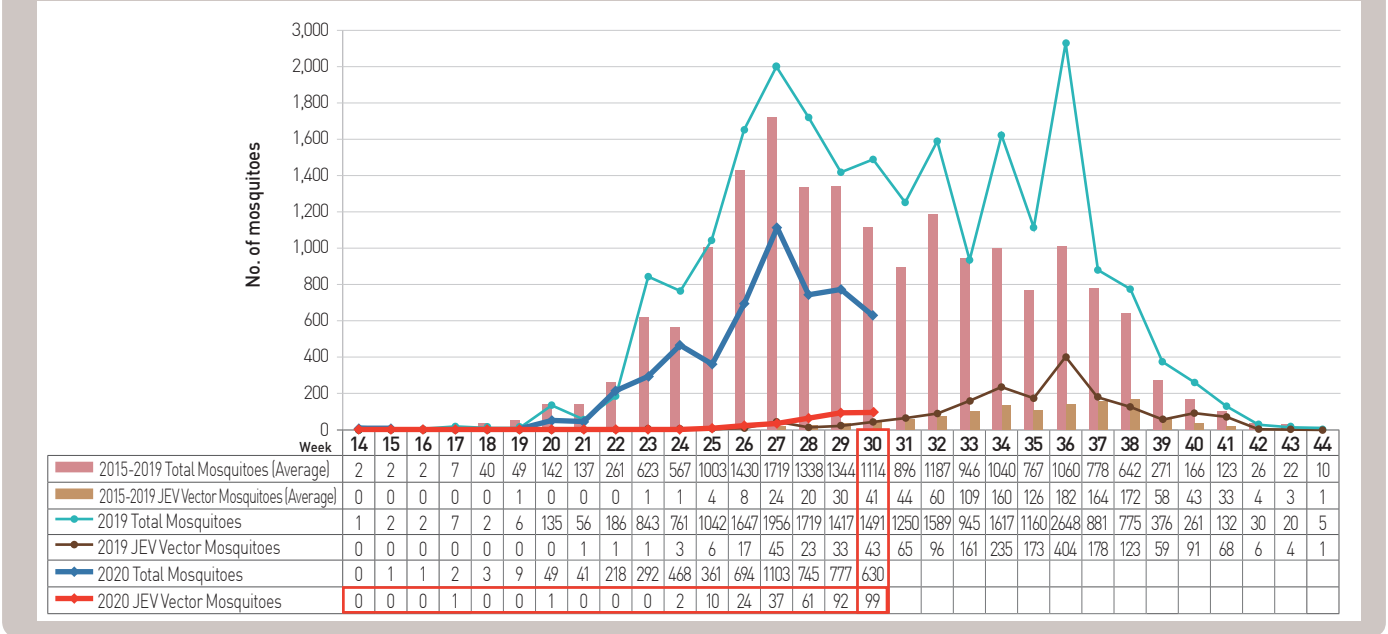
▣ Vector surveillance: Malaria vector mosquitoes, Republic of Korea, week ending July 25, 2020 (30th week)



Week	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
2015-2019 Total Mosquitoes(Average)	0	1	1	1	1	2	9	9	11	13	11	12	17	26	31	37	39	56	54	53	54	50	35	28	20	15	8	4	4	3	2
2015-2019 Malaria Vector Mosquitoes(Average)	0	0	0	0	0	0	0	0	0	1	1	2	5	9	12	13	14	22	19	23	28	26	27	15	9	6	3	1	0	0	0
2019 Total Mosquitoes	0	0	1	2	2	2	8	11	14	9	9	7	15	27	21	17	26	17	24	15	18	23	14	13	18	14	16	4	4	5	4
2019 Malaria Vector Mosquitoes	0	0	0	0	0	0	0	0	0	1	2	1	5	11	8	6	8	9	8	6	5	7	6	4	3	1	1	0	0	0	0
2020 Total Mosquitoes		0	0	0	1	2	9	7	10	8	9	7	9	11	10	12	10														
2020 Malaria Vector Mosquitoes		0	0	0	0	0	0	0	0	0	1	1	2	4	4	5	6														

Figure 10. Weekly incidences of malaria vector mosquitoes in 2020

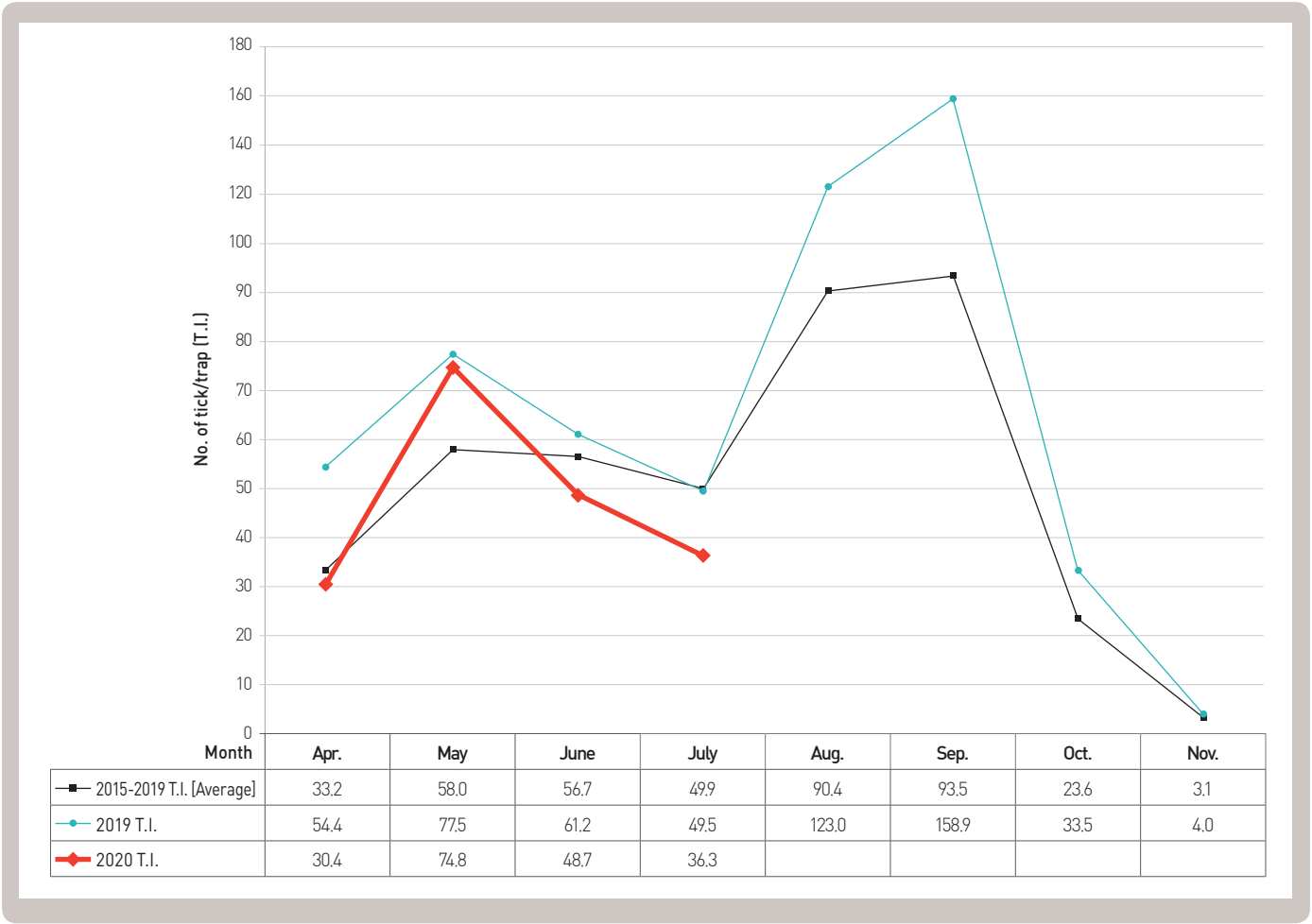
▣ Vector surveillance: Japanese encephalitis vector mosquitoes, Republic of Korea, week ending August 1, 2020 (31st Week)



Week	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
2015-2019 Total Mosquitoes (Average)	2	2	2	7	40	49	142	137	261	623	567	1003	1430	1719	1338	1344	1114	896	1187	946	1040	767	1060	778	642	271	166	123	26	22	10
2015-2019 JEV Vector Mosquitoes (Average)	0	0	0	0	0	1	0	0	0	1	1	4	8	24	20	30	41	44	60	109	160	126	182	164	172	58	43	33	4	3	1
2019 Total Mosquitoes	1	2	2	7	2	6	135	56	186	843	761	1042	1647	1956	1719	1417	1491	1250	1589	945	1617	1160	2648	881	775	376	261	132	30	20	5
2019 JEV Vector Mosquitoes	0	0	0	0	0	0	0	1	1	1	3	6	17	45	23	33	43	65	96	161	235	173	404	178	123	59	91	68	6	4	1
2020 Total Mosquitoes	0	1	1	2	3	9	49	41	218	292	468	361	694	1103	745	777	630														
2020 JEV Vector Mosquitoes	0	0	0	1	0	0	1	0	0	0	2	10	24	37	61	92	99														

Figure 11. Weekly incidences of Japanese encephalitis vector mosquitoes in 2020

▣ Vector surveillance: Severe fever with thrombocytopenia syndrome vector ticks, Republic of Korea, week ending July 25, 2020 (30th week)



Month	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.
2015-2019 T.I. [Average]	33.2	58.0	56.7	49.9	90.4	93.5	23.6	3.1
2019 T.I.	54.4	77.5	61.2	49.5	123.0	158.9	33.5	4.0
2020 T.I.	30.4	74.8	48.7	36.3				

Figure 12. Monthly incidence of severe fever with thrombocytopenia syndrome vector ticks in 2020

About PHWR Disease Surveillance Statistics

The Public Health Weekly Report (PHWR) Disease Surveillance Statistics is prepared by the Korea Centers for Disease Control and Prevention (Korea CDC). These provisional surveillance data on the reported occurrence of national notifiable diseases and conditions are compiled through population-based or sentinel-based surveillance systems and published weekly, except for data on infrequent or recently-designated diseases. These surveillance statistics are informative for analyzing infectious disease or condition numbers and trends. However, the completeness of data might be influenced by some factors such as a date of symptom or disease onset, diagnosis, laboratory result, reporting of a case to a jurisdiction, or notification to Korea Centers for Disease Control and Prevention. The official and final disease statistics are published in infectious disease surveillance yearbook annually.

Using and Interpreting These Data in Tables

- Current Week – The number of cases under current week denotes cases who have been reported to Korea CDC at the central level via corresponding jurisdictions(health centers, and health departments) during that week and accepted/approved by surveillance staff.
- Cum. 2018 – For the current year, it denotes the cumulative(Cum) year-to-date provisional counts for the specified condition.
- 5-year weekly average – The 5-year weekly average is calculated by summing, for the 5 proceeding years, the provisional incidence counts for the current week, the two weeks preceding the current week, and the two weeks following the current week. The total sum of cases is then divided by 25 weeks. It gives help to discern the statistical aberration of the specified disease incidence by comparing difference between counts under current week and 5-year weekly average.

For example,

* 5-year weekly average for current week= (X1 + X2 + … + X25) / 25

	10	11	12	13	14
2018			Current week		
2017	**X1**	**X2**	**X3**	**X4**	**X5**
2016	**X6**	X7	X8	X9	X10
2015	**X11**	X12	X13	X14	X15
2014	**X16**	X17	X18	X19	X20
2013	**X21**	X22	X23	X24	X25

- Cum. 5-year average – Mean value calculated by cumulative counts from 1st week to current week for 5 preceding years. It gives help to understand the increasing or decreasing pattern of the specific disease incidence by comparing difference between cum. 2018 and cum. 5-year average.

Contact Us

Questions or comments about the PHWR Disease Surveillance Statistics can be sent to phwrcdc@korea.kr or to the following:

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