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

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#### Abstract

This 3-month report (May 1, 2020 to July 31, 2020) on the Coronavirus Disease-19 (COVID-19) situation in the Republic of 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

## Introduction

Coronavirus disease 2019 (COVID-19) has infected 17,106,007 people worldwide as of July 31, 2020. In South Korea, the first case was reported on January 20, 2020, and 14,305 people were infected as of July 31, 2020. South Korea has maintained a crisis alert level 4 since February 23, 2020, and the entire government is focused on the response through the operations of the Central Disaster and Safety Countermeasure Headquarters headed by the Prime Minister.

This report presents an analysis of the characteristics of cases in major community outbreaks, excluding imported cases, since social distancing measures were relaxed on May 6, after which community outbreaks and sporadic cases have continued to be reported. COVID-19 case data reported from hospitals are subject to change after an epidemiological investigation to confirm the route of transmission, and the statistics by region can differ from the COVID-19 situation reports issued by local governments as the statistics are based on the address of the reporting agency. The data presented should be interpreted with these caveats in mind.

	January 20, 2020 – July 31, 2020								
			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)									
$\leq 9$	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 1. The number of confirmed/deceased cases and the incidence rate

### Result

# Characteristics of cases and fatalities by sex, age, and region

There were more female cases (54.8%) than males, and the overall incidence rate (per 100,000) was 27.6. In terms of age, those in their 20s accounted for the highest proportion of cases (25.3%), followed by those in their 50s (17.6%). Many cases were identified in Daegu, Gyeongbuk Province, and the Seoul metropolitan area, with 48.5% of cases in Daegu, 11.2% in Seoul, 10.8% in Gyeonggi Province, and 9.8% in Gyeongbuk Province. The incidence rate (per 100,000) by region was 284.8 in Daegu, 52.6 in Gyeongbuk Province, 16.4 in Seoul, 14.6 in Sejong, and 14.0 in Gwangju.

Among fatalities, there were more males (53.2%) than

females, and the overall fatality rate was 2.1%. The vast majority (93.0%) of all deaths occurred in patients older than 60, and the fatality rate increased with age. The fatality rate in those aged 80 or above was 24.9%. Furthermore, 63.5% of all deaths occurred in Daegu, 17.9% in Gyeongbuk Province, and 10.3% in Gyeonggi Province (Table 1).

## Case characteristics in various major community outbreaks

Since social distancing measures were relaxed on May 6, small and large community outbreaks and sporadic cases have continued to be reported. The characteristics of the major community outbreaks in the past 3 months are as follows (Figure 1, Table 2, Table 3, Table 4).



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

	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)

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

\* Church facilities: Lord Glory church, Wangsung church

#### A. Nightclubs (Seoul metropolitan area)

This community outbreak resulted in many positive cases associated with a nightclub in Seoul. The majority (74.0%) of infected cases were male, and almost half (44.0%) of infected cases were in their 20s. The cases associated with this outbreak were spread out throughout the country, but 91% were in the Seoul metropolitan area, with 50.2% in Seoul, 21.3% in Gyeonggi Province, and 19.5% in Incheon. The average age of infected cases was 33.1, and no deaths resulted from this community outbreak.

#### B. Small religious groups (Seoul metropolitan area)

This series of cases resulted in infections through small religious group meetings such as bible study groups and clergy meetings in Incheon, Seoul, and Gyeonggi Province. More than half (58.0%) of those who tested positive were female, and most were in their 60s (37.0%). Associated cases were only found in the Seoul metropolitan area, with 47.9% in Incheon, 31.1% in Seoul, and 21.0% in Gyeonggi Province. The average age of the infected cases was 55.9 years, and one death was associated with this community outbreak.

	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)

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

\* Church facilities: Lord Glory church, Wangsung church

#### C. Large logistics center (Seoul metropolitan area)

Many cases were associated with a large logistics center in Gyeonggi Province. Slightly more than half (53.3%) of the associated positive cases were female, and most of them were in their 30s (23.0%). Associated cases were only identified in the Seoul metropolitan area, with 44.1% in Gyeonggi Province, 40.1% in Incheon, and 15.8% in Seoul. The average age of the infected cases was 39.2 years, and one death was associated with this community outbreak.

### D. Door-to-door sales meetings (Seoul metropolitan area, Gwangju, Daejeon)

A chain of infections started from a door-to-door sales meeting and spread to other small groups. In this chain, 62.3%

	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	_	-

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

\* No deaths under the age of 60

of the associated cases were female, and most were in their 60s (30.3%). Most cases were in the Seoul metropolitan area and the Chungcheong and Honam areas. Specifically, 28.7% of positive cases associated with this outbreak were in Gwangju, 26.6% in Seoul, 19.1% in Gyeonggi Province, and 11.5% in Daejeon. The average age of the cases in this outbreak was 56.4 years, and seven deaths occurred (fatality rate, 1.4%), all of whom were over 60 years of age.

#### E. Fitness facility (Seoul metropolitan area)

A cluster of cases occurred at a table tennis court in Seoul. Slightly more than half (52.1%) of the positive cases were male, and most were in their 50s (41.1%). Cases were only identified in the Seoul metropolitan area, with 60.3% in Seoul, 38.3% in Gyeonggi Province, and 1.4% in Incheon. The average age of cases was 54.6 years, and one death was associated with this community outbreak.

#### F. Religious facilities (Seoul, Gyeonggi Province)

Many cases were associated with two religious facilities in Seoul and in Gyeonggi Province. The sex ratio was even, and 36.4% were in their 20s and 30s, respectively. Associated cases were only identified in Gyeonggi Province (53.0%) and Seoul (47.0%). The average age of cases was 35.4 years, and no deaths were associated with this community outbreak.

#### G. Residential facilities (Seoul, Gyeonggi Province)

Many cases were identified in an apartment complex in Gyeonggi, of whom 72.7% were male, and most were in their 60s (45.5%). Associated cases were distributed in three regions with 66.7% in Gyeonggi Province, 30.3% in Seoul, and 3.0% in Gangwon. The average age of cases was 49.8 years, and no deaths were associated with this community outbreak.

### Conclusion

In South Korea, the first case of COVID-19 was reported on January 20, 2020, and 14,305 people were infected as of July 31, 2020. This report presents an analysis of the characteristics of cases in major community outbreaks, excluding imported cases, in the most recent 3 months.

Since social distancing measures were relaxed after the holidays in early May, small and large community outbreaks centered around door-to-door sales, religious facilities, and public facilities have continued to be reported, mainly in the Seoul metropolitan area and the Honam area. Since small outbreaks continue to occur in South Korea, in order to prevent infections, it is important to abide by the quarantine policies.

To spend a safe summer holiday as August begins, it is important to always wear a mask indoors; to remain in rest stops, restaurants, and cafes for as short a time as possible and to refraining from conversation when eating; to wash one's hands frequently; and to maintain social distancing measures. When fever or respiratory symptoms are present, one should not travel—instead, one should remain at home. If symptoms deteriorate, one should contact a hotline or a community health center. Crowded indoor spaces, crowded tourist locations, and popular times to visit indoor establishments should be avoided, as should any activities that involve exhaling respiratory droplets or physical contact.

It is important to abide by quarantine measures in daily life in order to prevent community outbreaks. More active quarantine measures should be established for high-risk locations and facilities.

#### **(1)** What was previously known?

Since COVID-19 was first reported in China on January 2020, new cases have continued to be reported, both in South Korea and around the world.

#### **② What is newly learned?**

A of 14,305 COVID-19 cases have been reported in South Korea as of July 31, among whom 301 died. This report analyzed the characteristics of major community outbreaks that occurred after social distancing measures were relaxed in early May, and groups that require stronger quarantine measures in the community were identified.

#### **③ Implications?**

The Central Disease Control Headquarters, based on the COVID-19 case reports from hospitals made according to the infectious disease prevention law and epidemiological investigations by central and local epidemiological investigation teams, is sharing this analysis of trends in major community outbreaks of COVID-19 and response results in the past 3 months in order for the data to be used to establish effective response strategies and quarantine measures.

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