

Table 2. Topics drawn from Phase 1 (05/18/2020–12/17/2020)

Topic # (prevalance)	Subject	Words
1 (6%)	Global Responses to COVID-19	world, minister, Japan, UK, economy, summit, response, emphasis, conference, countries
2 (3.9%)		North Korea, minister, thought, government, claims, situation, information, media, South and North Korea, article
3 (4.1%)		Trump, president, US, presidential election, Donald, Pouch, major general, elected, White House, candidate
4 (11.5%)	The acquisition and supply of vaccines around the world	China, procure, government, provision, US, contract, purchase, justification, next year, AstraZeneca
5 (18.5%)	Results of the vaccines' clinical trials	clinical, test, US, result, effect, virus, AstraZeneca, candidate, progress, antibody
6 (4.1%)	Hacking the vaccine distribution network	company, US, economy, hacking, China, information, stock, market, Korea, world
7 (4.2%)		production, transportation, storage, Korean Air, transportation, company, pharmaceutical, representative, enterprise, distribution
8 (13%)	Status of infection and quarantine	COVID-19 cases, infection, situation, degree, quarantine, level, occurrence, patient, thought, mask
9 (6%)	The development of treatments in Korea	SK, Korea, president, medicine, cooperation, Bill Gates, support, Bioscience, CEO, production
10 (10.8%)		rise, US, stock market, market, economy, point, fall, outlook, recovery
11 (4.6%)	Stabilization of people's livelihoods in Korea	budget, support, citizen, payment, relief fund, government, national assembly, budget bill, next year, supplementary
12 (4.2%)		president, government, citizen, economy, policy, quarantine, secure, lawmaker, situation, Seoul
13 (5.1%)	Emergency use of vaccines	US, usage, emergence, start, next year, UK, BioNTech, FDA, food, CDC
14 (3.8%)	The start of vaccination	Russia, Sputnik, world, test, clinical, president, Putin, registration, Brazil, center

1

2
3
4
5
6
7
8
9
10
11
12

Table 3. Topics drawn from Phase 2 (12/18/2020–02/25/2021) with $\lambda = 1$

13

Topic # (prevalance)	Subject	Words
1 (6.6%)	Production of vaccine	China, production, US, SK, company, shot, Korea, world
2 (1.9%)	North Korea's attempt and suspicions to hack into treatment information	North Korea, hacking, National Intelligence Service, medicine, Israel, Pope, member, extortion, information, cyber
3 (7.6%)	Vaccination of United States Forces Korea	economy, US army, USFK, world, US, government, Korea, recovery, KATUSA
4 (11.5%)		citizen, president, government, minister, opposition, idea, real estate, representative
5 (4.7%)	Initiation and side effects of vaccination	US, Trump, start, allergy, CDC, side-effect, people, reaction, local time
6 (9.2%)	Vaccine clinical trials and results	virus, UK, effect, clinical, infection, result, test, variant, US, immune
7 (6.1%)		confirmed patient, quarantine, situation, distance, infection, degree, test, thought, patient, stage
8 (7.8%)		president, Cheong Wa Dae, citizen, investigation, approval rating, minister, prosecutor, representative
9 (3.3%)		doctor, lawmaker, medical association, citizen, license, nurse, Olympics, candidate, election, cancellation
10 (8.4%)	Status of vaccine acquisition in Korea	government, procure, citizen, quarantine, member, Japan, criticism, situation, comment, president
11 (4.5%)		market, rise, stock, forecast, US, index, interest rate, economy, next year
12 (14.2%)	Sequential vaccination plan in Korea	prevention, government, start, AstraZeneca, plan, subject, medical, work, hospital
13 (2.4%)	Transportation of vaccine	transport, temperature, storage, maintenance, sub-zero, freight, cold chain, distribution, Korean Air
14 (11.7%)	Plan on acquisition and supply of vaccine	government, procure, contract, provision, next year, AstraZeneca, justification, supply, US, start

14

15

16

17

18

19

20

21

22

23

24

25

Table 3-1. Topics drawn from Phase 2 (12/18/2020–02/25/2021) with $\lambda = 0.6$

Topic # (prevalance)	Subject	Words
1 (6.6%)		China, sk, production, company, corporation, injection, listing, company, factory, fund
2 (1.9%)		North Korea, hacking, National Intelligence Service, pope, deodorization, cyber, Intelligence Committee, bond, Palestine, Ha Tae-Kyung
3 (7.6%)		economy, US Army, US Forces Korea, Korea in Korea, Katusa Corporation, recovery, Korean, Ministry of National Defense, growth, world
4 (11.5%)		citizen, minister, real estate, the opposition party, the government, president, the ruling party, election
5 (4.7%)		US, CDC, Trump, allergy, pouch, elected, manager, local time, side effect, vice president
6 (9.2%)	mutation discovered in UK	virus, UK, effect, mutation, clinical practice, examination, infection, antibody, protein, discovery
7 (6.1%)		confirmed case, distance, public prosecutor, hospital bed, quarantine, new, infection, confirmed, stage, degree
8 (7.8%)		president, Blue House, approval rating, prosecution, survey, point, Yoon Suk Yeol, state of affair
9 (3.3%)		doctor, medical association, license, Olympics, medical law, nurse, cancellation, amendment, general strike, hosting
10 (8.4%)		government, securing, citizen, Japan, member of the House of Representatives, criticism, quarantine, article, point out, media
11 (4.5%)		stock market, rise, stock, index, interest rate, market, property, earning, KOSPI, outlook
12 (14.2%)		prevention, work, target audience, medical care, target, plan, hospital, AstraZeneca, medical staff, facility
13 (2.4%)		transportation, transport, temperature, cargo, Korean Air, cold type, property taxes, Asiana Airlines, apartment, distribution
14 (11.7%)		contract, supply, securing, justification, next year, volume of goods, AstraZeneca, government, ash powder, EU

Table 4. Topics drawn from Phase 3 (02/26/2021 – 03/31/2021)

Topic # (prevalance)	Subject	Words
1 (11.9%)		infection, quarantine, confirmation, degree, start, new, inoculated, test, situation
2 (7.3%)	The international situation	president, US, China, summit, government, Trump, cooperation, minister, Japan, conference
3 (9.6%)		interest rate, rising, US, market, economy, outlook, government bond, economy, recovery, stock market
4 (2.4%)		authorization, clinical, outcome, verification, virus, Ministry of Food and Drug Safety, Janssen, advisory group, trial, clinical trial
5 (24.7%)	Vaccination and the occurrence of side effects	reaction, AstraZeneca, death, case, hospital, prevention, side-effect, vaccinated, symptom, occurrence
6 (7%)	Adjusting amounts of AstraZeneca in Korea and overseas countries' interest in vaccine effects for mutant viruses	provision, EU, production, UK, supply, AstraZeneca, government, SK, export, justification
7 (2.8%)	Vaccination and consequent social change	China, Japan, Seocho, passport, border, clinical, Russia, progress, North Korea, issuance
8 (3.8%)	Domestic political issues and vaccine transportation	candidate, transport, mayor, Korean Air, election, president, citizen, thought, Seoul, member
9 (3.1%)		service, enterprise, government, information, company, guarantee, start, insurance, block, payment
10 (9.3%)	Vaccination and its side effect	US, effect, virus, clinical, result, infection, human, antibody, prevention, test
11 (2%)	Vaccine storage and transportation	storage, temperature, Daegu department store, transport, freezer, refrigerator, keeping, situation, underlying, distribution
12 (3.7%)		police, intelligence, fake, fake news, China, false, dissemination, response, Olympics, investigation
13 (8.4%)		government, support, leave, people, support, parliament, payment, president, size, budget
14 (4%)	Transportation of vaccine	start, transport, virus, arrival, Genexine, storage, progress, center, immune, ingredient

35

36

37

38

39

40

Table 5. Topics drawn from Phase 4 (04/01/2021 – 09/25/2021)

Topic # (prevalance)	Subject	Words
1 (8.8%)	The issue of securing domestic vaccine supplies	government, procure, president, citizen, supply, provision, portion, contract, situation, supply and demand
2 (6.1%)	Concerns about infection due to the holidays	Japan, vacation, information, thought, government, people, certification, offer, citizen
3 (3.1%)		company, semiconductor, Samsung Electronics, vice chairman, chairman, soldier, Ministry of National Defense, employee, inflation, Cheonghae Unit
4 (7.5%)		candidate, thought, people, president, congressmen, representative, Democrats, election, the opposition party, politics
5 (8.1%)		China, India, US, Russia, world, North Korea, supply, ash, Sputnik, EU
6 (2.8%)		temperature, UN, film, storage, performance, mobile, police, maintenance, distribution, Mrs.
7 (5%)	Infection status and clinical trials of vaccine	virus, infection, effect, antibody, result, professor, immune, prevention, people, gene
8 (7.1%)	The level of quarantine in Korea	situation, quarantine, degree, government, thought, saying, COVID-19 case, possible, distance, professor
9 (6.3%)	Latest development in the vaccine rollout	reservation, vaccinated, COVID-19 case, new, test, case, region
10 (9.3%)		US, president, Korea, cooperation, summit, support, diplomacy, Korea and USA, government
11 (8.6%)		rising, market, economy, US, outlook, record, price, contrast, performance, recovery
12 (10.4%)	Debate over the vaccine passport system	US, mask, UK, travel, Israel, Delta, human, CDC, population, infection
13 (8.4%)	Side effects of vaccine	side-effect, AZ, AstraZeneca, case, thrombosis, reaction, Janssen, hospital, occurrence, death
14 (8.6%)	Clinical trials of vaccine	production, clinical, SK, company, global, support, test, progress, Novavax, plan

41

42

43

44

45

46