

Machine learning analysis of government's public risk communication during COVID-19 lockdown in Wuhan, China

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ABSTRACT

COVID-19 pandemic has caused millions of deaths worldwide since 2020, and has led to significant lives and economic loss. It was first identified in Wuhan, China, while China has one of the lowest death rates. Understanding Chinese governments' focuses and strategies can offer insights into early pandemic control in the future. This study aimed to explore the strategies and practices of government risk communication adopted during the COVID-19 lockdown in Wuhan, China; and provide implications for effective health risk communication at the early stage of epidemic response. The 90 government press conference records during the Wuhan lockdown (from 22 January 2020 to 1 May 2020) were divided into three batches and preprocessed. Topic modeling, i.e., the Latent Dirichlet Allocation, was used to computationally extract the topics in each batch. We identified important topics early in the lockdown period such as "medical team's work", "assuring supplies for society", "patients detection and isolation"; in the middle batch such as "patient treatment and hospitalization", "enterprises' resumption of work and production", "epidemic prevention and control"; and later in the lockdown including "policies supporting enterprises", "ensuring employment", as well as "blood donation". We found that the Chinese government demonstrated responses that changed during the lockdown period aiming at allowing the society to resume usual activities at the pre-vaccination stage. Our results implied that the epidemic control relied on not only the effectiveness of public health policies, but also the collaboration and collective actions across different systems in the society.

KEYWORDS

COVID-19; government press conferences; topic modeling; natural language processing; health risk communication

1. Introduction

The coronavirus disease (COVID-19), caused by the SARS-CoV-2 virus, is a global respiratory pandemic since 2020 [1] and has led to 6.3 million deaths till June 2022 [2]. It was first identified in Wuhan China, and now it is spread to 219 countries, contributing to widespread economic losses attributable to physical isolations, lockdowns, border controls, slowing down in a wide range of economic activities, and inflations [3, 4]. Interestingly, China's number of deaths ranked the 88th globally in June 2022, and given that it is one of the most populous countries, China has one of the lowest COVID-19 death rates in the last two years of pandemic. Since Chinese government plays a range of leadership roles in various social and economic activities, including epidemic control, lessons that can be learnt from the Chinese responses will offer insights into future pandemic control.

Wuhan city in China was the first city which adopted lockdown measures to contain the spread of COVID-19 [5]. The citywide lockdown i.e. the 76-day lockdown [5] from 23 January to 7 April in 2020 was implemented. Major measures included that citizen were ordered by the government to stay at home, and the traffics and public movements during lockdown were highly restricted. Although a limited number of flights, trains, public transport services and highway traffics resumed since 8th April 2020 allowing exit from the city, many local communities were still in lockdown by the end of April until early May when schools were allowed to reopen [6]. Afterwards, a global scale of lockdowns against COVID-19 in 2020 were unprecedented [7]. Lockdowns were implemented in other world cities, countries and regions throughout year 2020-21, such as in London [8], New South Wales in Australia [9] and Singapore [10]. In a long history, lockdown was one of the non-pharmaceutical interventions to reduce the spread of epidemic diseases [11]. Lockdown was suggested to be an effective strategy to control the COVID-19 pandemic, particularly before the availability of extensive vaccinations [7, 12].

Yet, increasing research evidence suggested that lockdowns might have caused a range of negative impacts on mental health and wellbeing [13-15]. During an emergency and disaster, people often experience information overload from many communication channels, such as social media, television, radio and newspaper [16, 17]. Although the sources are diverse, the information overload is often associated with issues such as missing important information, misunderstandings, selective exposure, exposing to misinformation and disinformation, which can lead to emotional and mental fatigues and stress, and unwillingness to receive relevant information [18, 19]. Therefore, efficient and sufficient risk communication is needed for public to develop responsive strategies on individual, household and organization levels in a large-scale lockdown against unpredictable epidemic.

Risk communication refers to the behavior of disseminating risk information which is a type of specialized communication process that addresses the public on life saving for oneself and their families, and adopting attitudes and behaviors that lower the risks of hazards [20]. Previous studies showed that inefficient government risk communication may result in a great deal of public confusion and misunderstanding, as well as serious errors in responding to the COVID-19 pandemic, leading to disastrous health and social outcomes [21]. A recent qualitative analysis of the COVID-19 related Instagram posts by the government bodies of the United Arab Emirates showed popular themes in the risk communications including "reducing ambiguity", "promoting effective healthy behaviors", "clarifying government actions", "empathy and encouragement", "warnings", "correcting rumors and misunderstandings", and "news and events" [20]. Governments should actively and timely share public health

information, develop innovative strategies to respond to health threats, to calm tensions, and to provide public health directions [20].

Effective risk communication should be one of the priorities in the government's active response to the pandemic [21, 22]. The regular press conference/release was one of the practices most adopted by the local and national governments, and international organizations (e.g., WHO) to communicate with the public when responding to the COVID-19 pandemic [23, 24]. A systematic text analysis of the messages and contents that government communicated with the public can provide insights into a better understanding of risk communication during the pandemic and its recovery.

This study aimed to explore the topics, strategies and practices of government risk communication adopted during the Wuhan lockdown and provide implications for effective government risk communication in the early response to the epidemic. This study examined the records of regular press conferences held by local government regarding COVID-19 involving a range of speakers and participants, scrutinized the types of information provided to the public, and explored the main communication strategies used. The findings could provide insight into the risk communication between the government and the public at the critical pre-vaccination stage in the pandemic response.

2. Data and methods

2.1. Data sources

The data sources were the records of Chinese COVID-19 press conferences held by the Chinese government in Hubei province, between 22 January and 1 May 2020. In total there were 90 press conferences, and we divided them into three almost equal batches according to the local lockdown and COVID-19 response experience. Batch 1 (1st-33rd, 22 January to 26 February), batch 2 (34th -66th, 27 February to 7 April), and batch 3 (67th -90th, 8 April to 1 May) was the first, middle and last one-third of the press conference records respectively in 2020. The text records were downloaded from The State Council Information Office of the People's Republic of China [25] as plain text files. In each record, the content was composed of multiple short paragraphs which conveyed a range of main and specific contents. As this study analyzed the second-hand public text data, the ethical review was not required.

2.2. Data Preprocessing

Data preprocessing was implemented in the R statistical programming environment. The empty lines in the text records were removed. After that, all text records were encoded with Unicode (or Universal Coded Character Set) Transformation Format – 8-bit (UTF-8) [26]. The Chinese vocabularies in the text corpus were segmented using the Maximum Probability Segmentation Model and Hidden Markov Model in the jiebaR package [27] with reference to a user dictionary, and the results were returned by lines. The user dictionary was composed of our user-defined dictionary, the open source Chinese vocabularies from GitHub [28] and an open Chinese dictionary [29]. Next, the punctuations and stop words were removed except for numbers. As for the stop word list, in addition to our manually defined list, we also used other sources of stop words downloaded from GitHub [30], and the default list from the package jiebaR [31]. After the data cleaning procedure, the pre-processed segmented corpus was then converted into a document-term matrix [32] for topic modeling.

2.3. Data analysis

We adopted the Latent Dirichlet allocation (LDA) model [33], which is one of the most popular topic modeling techniques to extract topics from the preprocessed text corpus. First, it was vital to determine the number of topics upfront due to the mechanisms of the model. We performed and compared results from four metrics, i.e. the Latent Concept Modeling [34], Bayesian model selection [35], KL-Divergence [36], and density-based selection [37] to determine the optimal number of topics in each batch fairly (Appendix I, Supplementary Fig. A.1-A.3). Each metric was calculated for the LDA model using the Gibbs sampling method [38] with the setting of the number of topics ranging from 2 to 20. The model with the highest scores in the metrics of Latent Concept Modeling [34] and Bayesian model selection [35], and the lowest scores in the metrics of KL-Divergence [36] and density-based selection [37] was considered suitable for LDA analysis with the respective number of topics.

After determining the number of topics, a final LDA model using the variational expectation-maximization (VEM) method [33] was built, and the posterior probabilities of the word terms for each topic (beta values) and posterior probabilities of the topics for each document (gamma values) were calculated. Word cloud for each topic was produced where words with higher beta values have larger font size and deeper color [39].

Moreover, we also computed the pairwise correlations [40] between words in the corpus, where each word has a count of at least 30. The cutoff of word count was determined by the inflection point on the concave up decreasing curve where word count (Y-axis) was plotted against words sorted by counts (X-axis). The correlations with the coefficient larger than 0.3 were plotted on a graph by running the Fruchterman-Reingold algorithm [41], where edges with deeper colors and thicker sizes represent stronger correlations [42, 43]. We set the correlation cutoff at 0.3 since literature suggested that 0.3 or smaller values were considered small to negligible [44, 45].

3. Results

3.1. Speakers in the press conferences

In total, there were 379 speakers for the ninety press conferences (Table 1). In each press conference, there were two to seven speakers. The Hubei province government and Wuhan local government were administrating on different levels and were primarily responsible to hold the COVID-19 press conferences. In addition to the Communist Party of China (CPC) and government leaders (39 out of 379, 10.2%), the representatives of health commission (including the Chinese Center for Disease Control and Prevention, 81 out of 379, 21.4%) and other departments (105 out of 379, 27.7%) of both Hubei province and Wuhan were frequent speakers for the press conferences. These departments included the Department of Agriculture and Rural Affairs, Ecology and Environment, Economy and Information Technology, Education, Finance, Food Administration, Human Resources and Social Security, Public Security, Science and Technology, Transport, and Water Resources. The mayors/representatives of surrounding cities in Hubei Province also constituted a major proportion of speakers (50 out of 379, 13.2%). The speakers also included national health professionals/scholars (9 out of 379, 2.4%), representatives of local hospitals (responding to COVID-19) in Wuhan (32 out of 379, 8.4%), Release and Deployment Teams from all over the country (50 out of 379, 13.2%), and enterprises (13 out of 379, 3.4%). Except the Tibet province, all the other 31 provinces/municipalities all sent Release and Deployment Teams to

Wuhan and its surroundings cities where the number of COVID-19 cases was high, and the local health care systems were collapsed. All the enterprises, which spoke for the COVID-19 press conference, were state-owned and providing critical important services for the COVID-19 response and recovery. These enterprises provided the services in terms of clinical laboratory, electricity, water, banking, railway, airport, river port and routes.

Table 1 The background of speakers for the COVID-19 press conference during the Wuhan lockdown

Category	N	%
CPC and government leaders of Hubei Province	18	4.7
CPC and government leaders of Wuhan	21	5.5
Health Commission of Hubei Province	75	19.8
Health Commission of Wuhan City	6	1.6
Other departments of Hubei Province government	67	17.7
Other departments of Wuhan government	38	10.0
The mayors/representatives of surrounding cities in Hubei Province	50	13.2
National health professionals/scholars	9	2.4
Local hospitals in Wuhan	32	8.4
Release & deployment teams	50	13.2
Enterprises	13	3.4
Total	379	100

CPC Chinese Communist Party.

3.2. Topic modeling results in the three batches of press conferences

The topic modeling was done in each batch of press conferences, showing the temporal change in the topics of government risk communication, response and public recovery from the beginning stage to the middle stage, till the end stage of lockdown.

3.2.1. Stage I

In the first one-third of the press conferences (22 January to 26 February), the metrics for finding topic numbers [34, 37] indicated that six topics was optimal. The posterior probabilities (Appendix II, Supplementary Table B.1-B.3) of word terms in each topic were visualized in the word clouds. And the results of correlations between word terms (Appendix II, Supplementary Table B.4-B.6) were presented in the correlation graph.

In topic 1, the terms “supplies”, “protective suit/coverall”, “media”, “Hubei”, and “facial mask” had the highest posterior probabilities (Fig. 1a). The word term “supplies” had a moderate correlation with “protective suit/coverall” which had a strong correlation with “facial mask” (Fig. 2). The word “media” had a moderate correlation with “announce”. The province “Hubei” was moderately correlated with “new coronavirus”, “viral infection” and “pneumonia” respectively.

In topic 2, the terms “epidemic”, “prevention and control”, “work”, “community”, and “Wuhan” were more important than other terms (Fig. 1b). The term “Epidemic” had strong correlation with “prevention and control” which had moderate correlations with “work” (Fig. 2). We

recognized that “community” was moderately associated with “party members and cadres”, “resident”, “village”, and “screening” respectively.

Some key terms like “patient”, “treat”, “severe case”, “patient”, and “hospital” had high probabilities in topic 3 (Fig. 1c). The term “patient” was moderately correlated with “treat” and “severe case” respectively (Fig. 2). “Patient” was found moderately associated with “fever”, and “hospital” was correlated with “Fangcang Hospital”.

In topic 4, there were several key terms like “medical team”, “work”, “epidemic”, “prevention and control”, and “treat” which had the highest beta values (Fig. 1d). The key term “medical team” was having moderate correlations with “deployment” and “Aid Hubei” respectively (Fig. 2).

The word tokens such as “supplies”, “assure”, “enterprise”, “epidemic”, and “medical treatment” were the most significant terms in topic 5 (Fig. 1e). The term “supplies” had a moderate correlation with “assure” which had association with “supply” (Fig. 2). “Enterprise” also had moderate correlation with “supply”. The term “medical treatment” was moderately associated with “treat” and “resource” respectively.

In topic 6, “detect”, “patient”, “fever”, “isolation”, and “community” were the word tokens which had high posterior probabilities (Fig. 1f). “Detect” had strong correlation with “nucleic acid” and moderate correlation with “ability” (Fig. 2). “Fever” was strongly associated with “outpatient”, and had moderate correlations with “screening”, “observe”, “isolation”, “observe”, “patient”, and “close contacts” respectively.

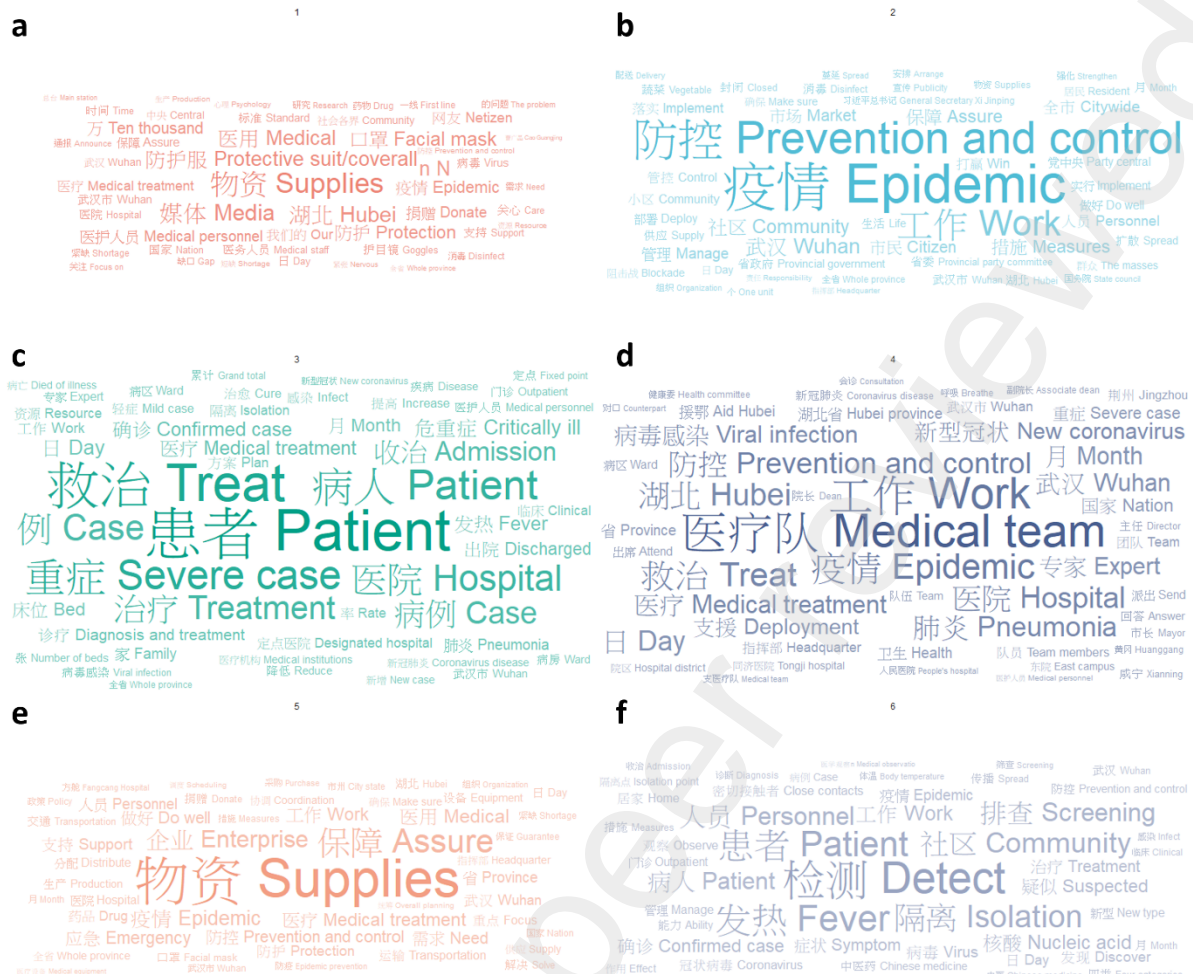


Fig. 1. Word clouds of the topics in the first one-third of press conferences (22 January to 26 February 2020). **a** Topic 1 “supplies of medical products”. **b** Topic 2 “epidemic prevention and control”. **c** Topic 3 “patient treatment and hospitalization”. **d** Topic 4 “medical team’s work”. **e** topic 5 “assuring supplies for society”. **f** Topic 6 “patients’ detection and isolation”. The size and the opacity of the characters indicated the level of probability.

3.2.2. Stage II

In the middle one-third of the press conferences (27 February to 7 April), the metrics for finding topic numbers showed that three topics was the optimum number. In topic 1, the word terms “patient”, “hospital”, “treat”, “medical treatment”, and “severe case” had the highest posterior probabilities (Fig. 3a). The term “patient” had a moderate correlation with “severe case”, “hospital”, and “treat” which in turn had moderate association with “medical treatment” (Fig. 4).

In topic 2, the word tokens “enterprise”, “case”, “day”, “resume work”, and “month” were more significant than other terms (Fig. 3b). The word “enterprise” had moderate correlation with “resume work” (Fig. 4). It was identified that “case” had strong correlations with “2020”, “% of the province”, “grand total”, as well as moderate correlations with “report”, “whole province”, “city state”, “Wuhan”, “March”, “24 o’clock”, “new case”, “confirmed case”, “0 cases”, “critically ill”, “died of illness”, “still”, “hospital”, “cure”, and “discharged” respectively.

Several key words like “epidemic”, “prevention and control”, “work”, “Hubei”, “Hubei province”, and “Community” had high probabilities in topic 3 (Fig. 3c). The term “epidemic” was strongly correlated with “prevention and control” which had moderate correlation with “work” (Fig. 4). The “Hubei” had moderate associations with “new coronavirus”, “viral infection” and “pneumonia” respectively. “Hubei province” was moderately correlated with “Centers for disease control and prevention”, “deputy director” and “24 o’clock” respectively. The term “community” was found moderately associated with “village”, “volunteer”, and “resident”.

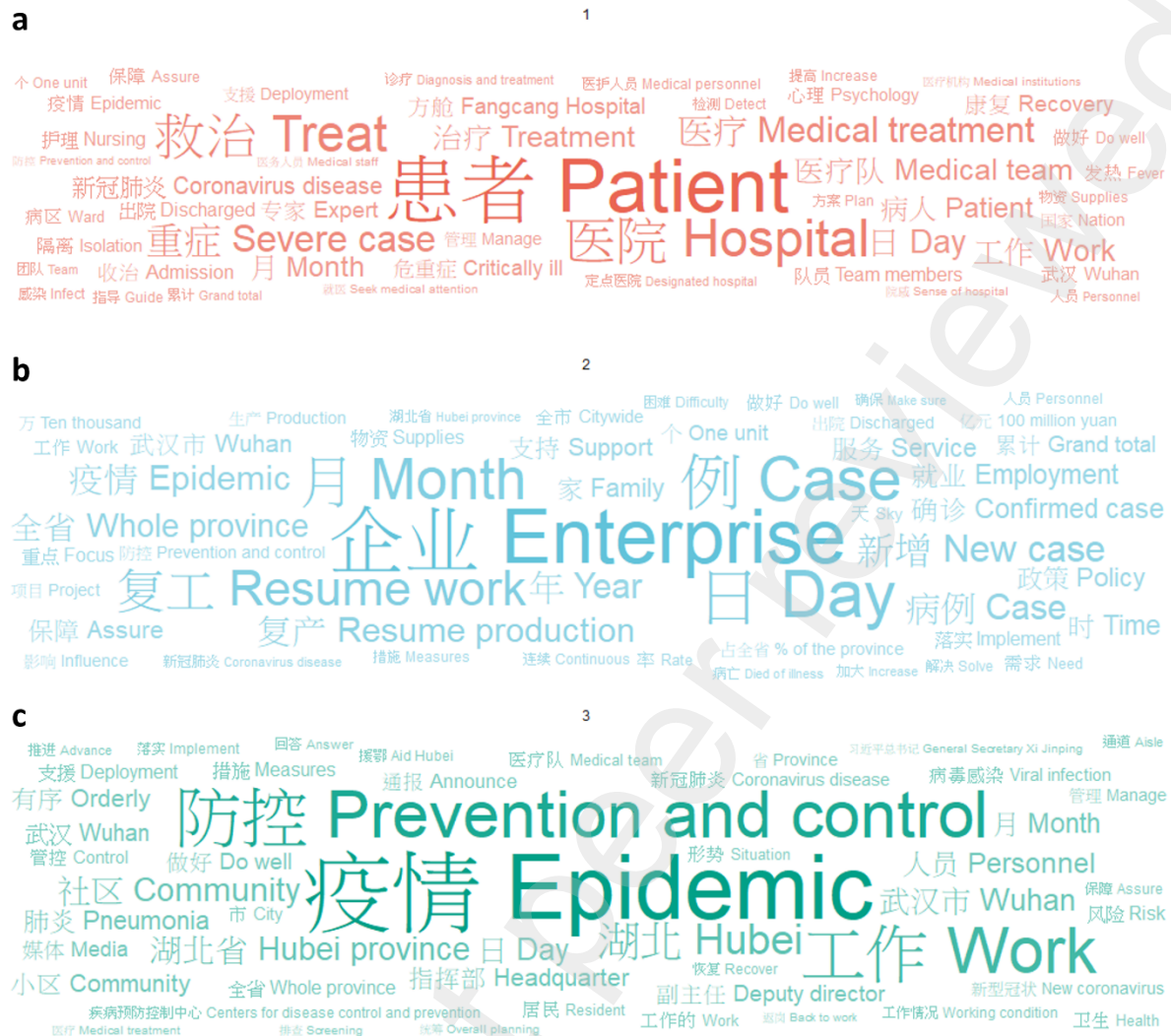


Fig. 3. Word clouds of the topics in the middle one-third of press conferences (27 February to 7 April 2020). **a** Topic 1 “patient treatment and hospitalization”. **b** Topic 2 “enterprises’ resumption of work and production”. **c** Topic 3 “epidemic prevention and control”. The size and the opacity of the characters indicated the level of probability.

257 In the last one-third of the press conferences (8 April to 1 May), the number of topics
 258 determined was six. In topic 1, the word terms “enterprise”, “support”, “100 million yuan”,
 259 “resume work” and “policy” had the greatest posterior probabilities (Fig. 5a). The key term
 260 “enterprise” had a moderate correlation with “resume work” (Fig. 6). Moreover, “enterprise”
 261 had moderate association with “support” which was moderately correlated with “policy”. The
 262 word “enterprise” also was associated moderately with “loan” which had a correlation with
 263 “100 million yuan”.

264 In topic 2, the word tokens “case”, “day”, “month”, “Hubei province” and “epidemic” had
 265 higher importance than other terms (Fig. 5b). We found that “case” had strong correlations
 266 with “2020”, “grand total”, and “April”; and moderate correlations with “report”, “whole
 267 province”, “city state”, “24 o’clock”, “new case”, “confirmed case”, “0 cases”, “died of illness”,
 268 “cure”, “discharged”, “change”, “asymptomatic” and “infected” respectively (Fig. 6). The term
 269 “Hubei province” was moderately correlated with “Centers for disease control and prevention”,
 270 “deputy director”, “24 o’clock”, and “case” respectively. The term “epidemic” had strong
 271 correlation with “prevention and control”, and had moderate correlations with “work”, “period”,
 272 “influence”, “Hubei”, “new coronavirus”, “viral infection”, and “pneumonia” respectively.

273 Some word terms such as “epidemic”, “month”, “enterprise”, “assure” and “get rid of poverty”
 274 had high probabilities in topic 3 (Fig. 5c). “Get rid of poverty” was strongly correlated with
 275 “tackling” and moderately associated with “population in poverty”, “support” and also
 276 “poverty alleviation” (Fig. 6).

277 In topic 4, there were some key terms such as “resume work”, “epidemic”, “employment”,
 278 “enterprise”, and “resume production” which had the highest beta values (Fig. 5d). The term
 279 “resume work” was strongly correlated with “resume production” and had a moderate
 280 correlation with “enterprise” (Fig. 6). “Employment” correlated moderately with “encourage”,
 281 “start a business”, “post”, “stable post”, “subsidy” as well as “poor households”.

282 The tokens such as “prevention and control”, “epidemic”, “personnel”, “measures” and “work”
 283 were the most significant terms in topic 5 (Fig. 5e). The word “personnel” had moderate
 284 correlations with “gather”, “detect” and “body temperature” respectively (Fig. 6).

285 In topic 6, “handle”, “blood”, “media”, “epidemic” and “business” were the word tokens which
 286 had higher posterior probabilities (Fig. 5f). The term “handle” had strong correlation with
 287 “business” (Fig. 6). On the other hand, “blood” was moderately associated with “clinical” and
 288 had moderate correlation with “blood donation”. The word “media” was moderately correlated
 289 with “announce”.



Fig. 5. Word clouds of the topics in the last one-third of press conferences (8 April to 1 May 2020). **a** Topic 1 “policies supporting enterprises”. **b** Topic 2 “routine reporting of new cases”. **c** Topic 3 “addressing poverty issues”. **d** Topic 4 “ensuring employment”. **e** Topic 5 “epidemic prevention and control”. **f** Topic 6 “blood donation”. The size and the opacity of the characters indicated the level of probability.

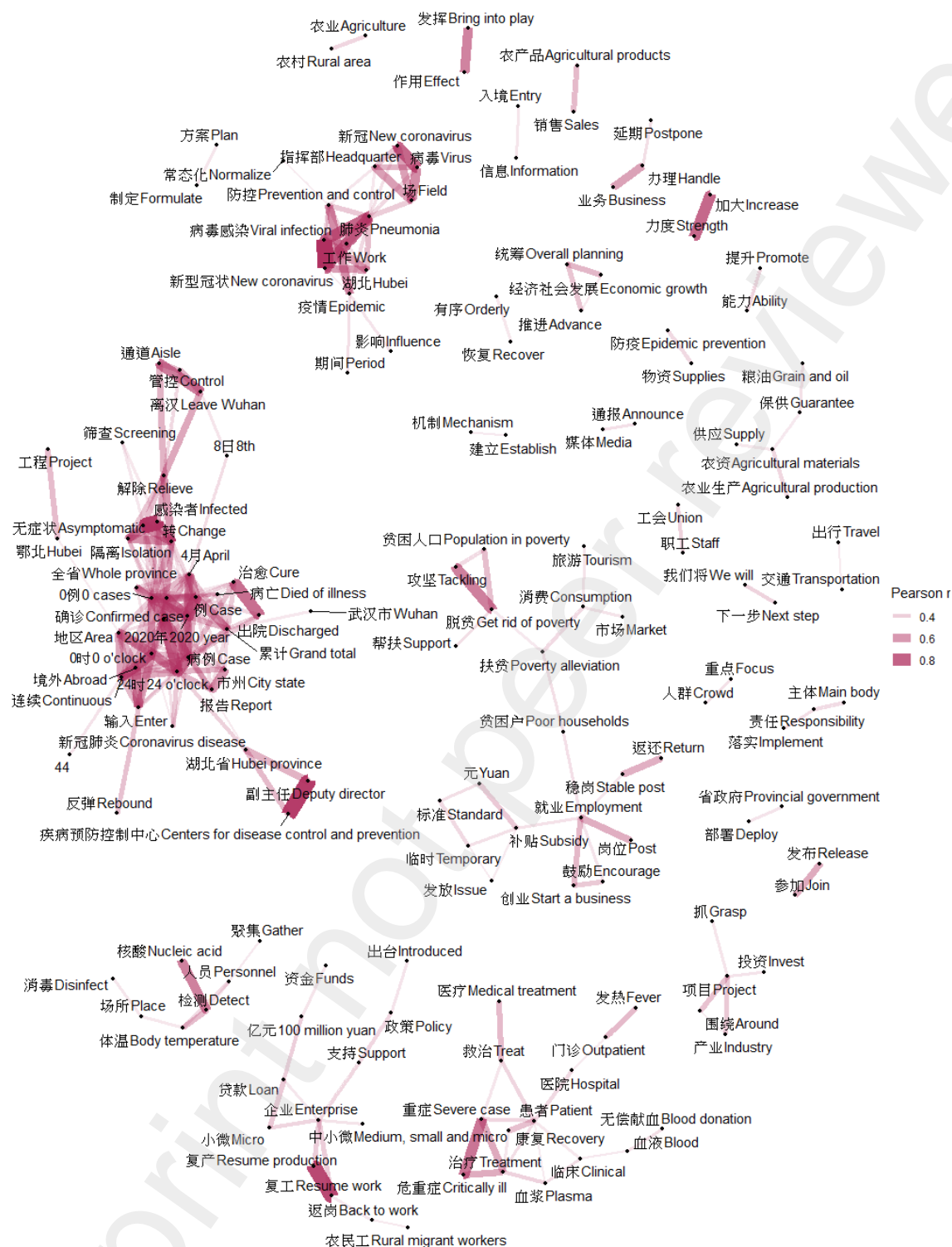


Fig. 6. Correlation graph between terms in the last one-third of press conferences (8 April to 1 May 2020). The thickness and the opacity of the edges indicated the strengths of Pearson correlations.

4. Discussion

4.1. Main findings

During the Wuhan lockdown in 2020, several million people were undertaking near-complete immobilization, and the Chinese government established press conferences for important risk communications with the public. To analyze the text from government risk communications, we used topic modeling to explore the topics in the 90 press conferences during the Wuhan lockdown. In each press conference, a decreasing numbers and statistics of COVID-19 confirmed cases were reported. Moreover, there was also a temporal change in the topics of the government risk communication during the Wuhan lockdown.

At the first stage, the press conference focused on the resource supplies (e.g., facial masks and protective suits), disease screening and preventions in the communities, hospitalization and treatment for the patients, deployments to aid Hubei, detection and isolation of patients. In this stage, we identified six topics which were “epidemic prevention and control”, “patients’ detection and isolation”, “patient treatment and hospitalization”, “medical team’s work”, “supplies of medical products”, and “assuring supplies for society”. According to the results, the work on epidemic prevention and control was a key focus in the press conference. It showed that Chinese officials were expected to work on community screening for residents and villagers in Wuhan city. For the disease surveillance in the community, raising nucleic acid test’s capability in detection, screening fever cases at outpatient department, patients’ isolation and observation, and tracing close contacts were emphasized in the government risk communication. Also, treatment and hospitalization for fever cases, COVID-19 patients and severe cases were emphasized in the press conference. Fangcang Hospital was built specialized for COVID-19 cases. Another addressed area was aiding Hubei province by deploying medical teams for the work of disease treatment, control and prevention against the epidemic. The supplies of medical equipment and materials against viral pneumonia due to new coronavirus in Hubei province was also a focus at the beginning of the epidemic and lockdown. The facial masks and protective suits were on demand. Also, media reporting government’s announcements was playing a role in the public communication. Beyond medical supplies and resources for treatment, the government also aimed to assure supplies for enterprises and the society during the epidemic.

In the second stage, the press conferences addressed the hospitalization and treating severe cases, resumption of work in enterprises, as well as disease prevention and control in the community. In this stage, the three topics were “epidemic prevention and control”, “patient treatment and hospitalization”, and “enterprises’ resumption of work and production”. The work of epidemic prevention and control for residents and villagers in the communities involved senior officials of the Chinese CDC and volunteers who continued to fight against viral pneumonia attributable to the coronavirus in the Hubei province. Moreover, the treatment and hospitalization for COVID-19 patients and their severe cases were still key focuses in the press conferences. A new topic was the reports of the number of daily and monthly new cases, confirmed cases, hospitalized cases, critically ill cases, deaths, recovered and discharged cases in 24 hours and the resumption of work in enterprises. The case statistics included percentage and grand total in the Wuhan city and Hubei province.

The third stage focused on enterprise, employment and work resumption, discharge and asymptomatic infected cases, support for population in poverty, and blood donation. In this stage, we recognized six topics including “routine reporting of new cases”, “epidemic prevention and control”, “policies supporting enterprises”, “ensuring employment”,

“addressing poverty issues”, and “blood donation”. The statistics of daily and monthly cases including asymptomatic cases in the Hubei province, as reported by the officials of the Chinese CDC, during the epidemic period continued to require works of prevention and control of coronavirus infection and had influences on the society. The work of disease prevention and control against the epidemic continued to be a focus in the press conference. For example, there should be raising awareness about personnel gathering and checking body temperature. In the last stage of lockdown, the government announced policies to support enterprises’ resumption of works including loans of millions of Chinese Yuan. Another focus in the press conference, similar to the previous stage, was the resumption of work and production in enterprises as well as employment issues during the epidemic. The government encouraged starting business, concerned about job stability and employment for poor households, and would subsidize those in need. During the epidemic, tackling poverty and supporting the population in poverty related to enterprises’ activities over the months were objectives that the government would like to assure. At the later stage of lockdown, the government concerned about public’s handling of businesses during the epidemic and also blood donation for clinical use. The media was playing a role to communicate government’s announcements to the public.

4.2. Interpretations in context

Government played a critical role in the process of actively mitigating threats of disease spreading through continually building and reshaping responsive policies and programs to strengthen the system infrastructure and response to protect the society [21, 46, 47]. The press conferences during the lockdown in Wuhan linked different levels of governmental representatives across different domains and provided consistent and concise information, which also indicated an effective local governmental system at the early stage of COVID-19 response. When facing highly equivocal challenges that are novel, unpredictable, difficult to control caused by the COVID-19 pandemic, the local governments on the city and provincial levels had developed intricate matching response to these challenges that take all of the complexities of the problem into account. The local governments on different levels collaboratively provided direction and promoted coordination between key subsystems, which included health agencies, transportation, human resource and employments, agricultural and production, bank service and corporate loan, industrial development recovery, human and resource deployment and so on.

The government also sought necessary and sufficient expertise support from public health experts, vaccine and medicinal researchers, health-care system administrators, and medical equipment manufactures. In addition to the medical staff from the military, thousands of health care workers were deployed to Wuhan and its surrounding cities from other provinces. By inviting the representatives of the deployed rescue teams from the other thirty-one provinces/municipalities to the press conferences, the government successfully connected the pandemic responses in the epidemic and the people in the other areas of China. This is one of the prominent strategies used by the local government for public risk communication at the early stage of COVID-19 response in China.

Government risk communication with the public was one of the effective ways to enhance the public capabilities to adapt, adjust and cope with the lockdown [5, 48]. In Wuhan, the government press conferences responded to questions from the citizens, also internet users, in six out of the 90 press conferences in early February 2020, which was the early stage of the Wuhan lockdown. This provided an opportunity to establish effective interactive pandemic-related communication system with the public, which can further enhance the cohesions of health risk communication during lockdowns. However, the response to questions from the

citizens had not been sustained in the middle and last stage of the lockdown in Wuhan according to our observation.

4.3. Added values in context

COVID-19 has imposed devastating impacts on public health and the society [49, 50]. In this study, important lessons have been learnt from the Chinese government's risk communication at the early stage of pandemic response. First of all, appropriate early responses to the pandemic, which include lockdowns, mass testing and cases tracking, mandatory mask wearing and social distancing, could reduce the damage to the society before mass vaccinations. Collaborative coordination between governments on different levels and a range of sectors in the society are crucial to share expertise and resources to mitigate serious public health threats during the pandemic [21, 51]. In addition to the government leaders and public health authorities, other systems in government and sectors in the society should be actively involved in the immediate response and recovery from the pandemic.

Second, for risk communication during lockdowns, both individuals and business sectors need important information regarding public health protection, as well as education, transport, food and supplies, employment and human resources, communication and travel, bank and insurance service etc., to guide rational and coordinated behaviors. The daily press conferences during Wuhan's lockdowns were good examples of centralized information management, which allowed governmental leadership to filter information which hinder public disease control, and to provide the public with information which best be supported by scientific evidence [21]. During the lockdown, a two-way process involving clear messages for different systems in the society and responding to the questions from the public, can increase the effectiveness of government risk communication to avoid confusion, fear, or misunderstanding in the communities.

In summary, a cooperative and coordinated government communication and response activity is important to efficiently provide the epidemic related information to the public. The press conference was found one of the effective ways to deliver relevant and useful information. For future disaster management and pandemic control, simulations and scenarios can be designed based on the experiences of Wuhan lockdown to protect public health in different systems of the society.

4.4. Limitations

There were some limitations related to the interpretations of the study findings. First, the data sources were the government press conferences which could represent the views of the government only. The data source was limited to press conference records but no other published contents. Second, a Chinese word comprises one or more than one Chinese character. The worker function of JiebaR segmented the words based on the dictionaries specified and the sentence structure. Occasionally a few segments might not be interpretable and require correction. Third, our approach was a bag of words analysis in which the probabilities of terms in each topic as well as correlations between words were calculated. The order of the words in a sentence and the broader meaning in a more complex sentence structure might not be fully addressed. Therefore, the results need careful interpretation and narrative analysis which were assisted with the statistical results.

5. Conclusions

Wuhan city in China had implemented aggressive and strict lockdowns together with mass disease testing, tracking, prevention, treatment, and research strategies to slow down the immense spread of the coronavirus. The risk communication during Wuhan's lockdown indicated that the successful responding strategies and rapid recovery relied on the effectiveness of public health policies, and also collaboration and collective actions between systems in the society. Governments on different levels and various sectors in the society worked collaboratively to follow responsive adaptive strategies to achieve the systemic goals fighting against the COVID-19 transmission, decreasing the number of infections and deaths, and facilitating the recovery before effective mass vaccinations become available. Chinese experiences can be important references for tackling future pandemics early.

Ethical approval

As this study analyzed the second-hand public text data, the ethical review was not required.

Declaration of competing interest

All authors declare that they have no conflict of interest.

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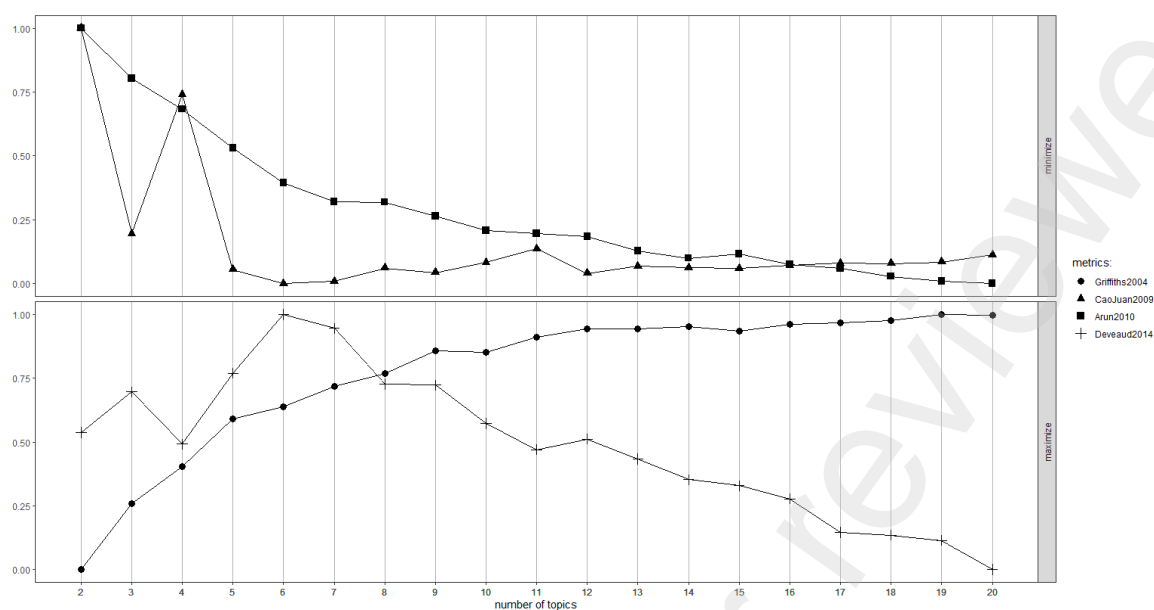
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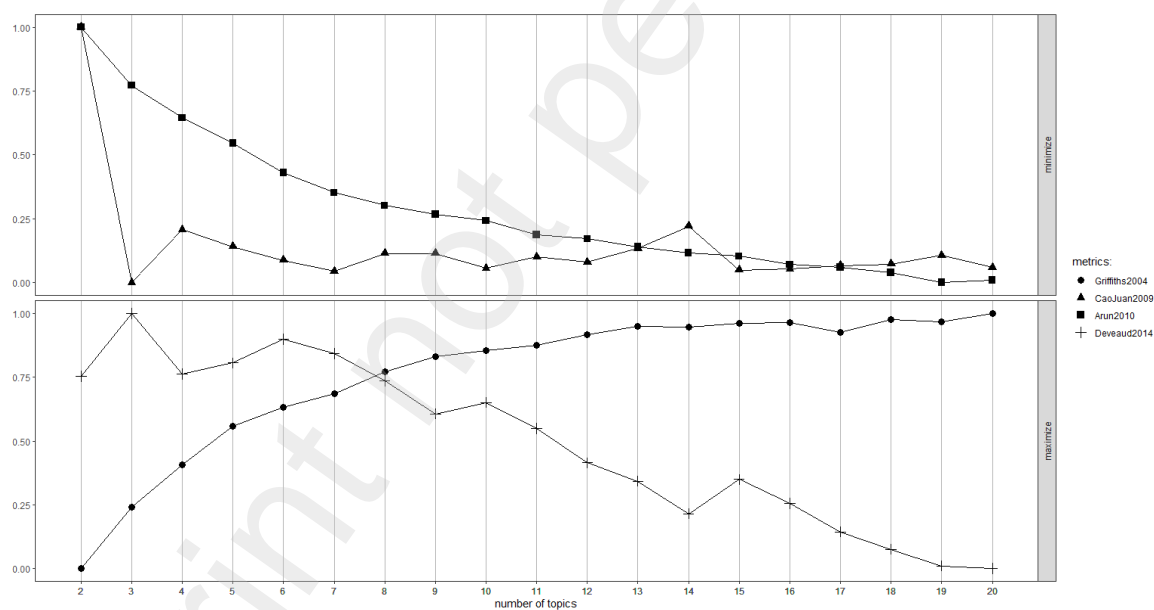
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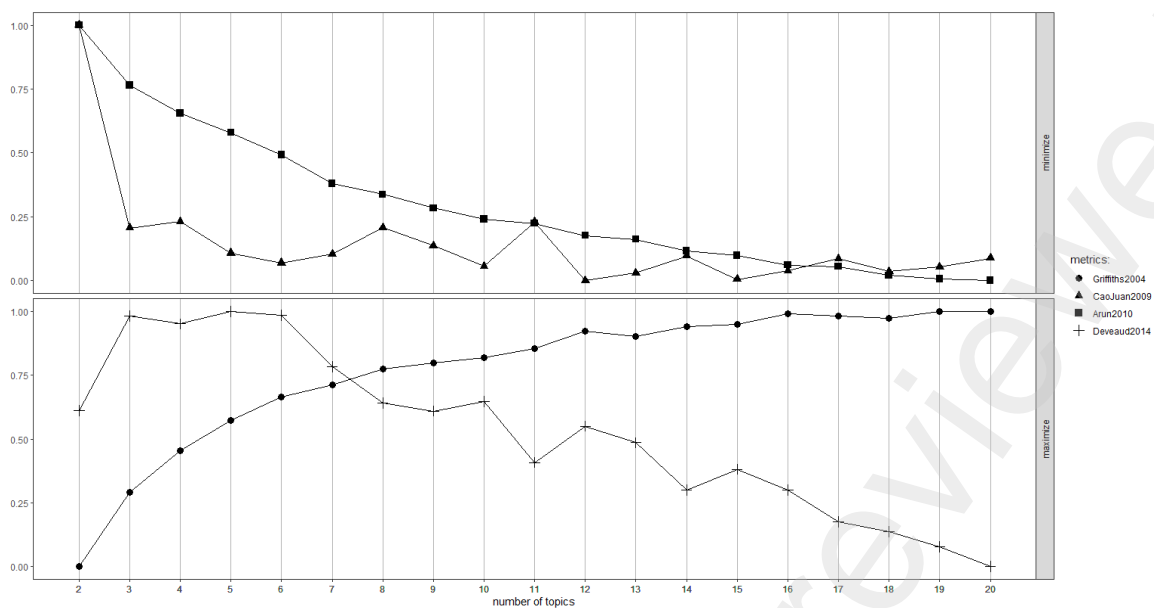
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Supplementary Fig. A.1. Metrics to determine the number of topics in the first one-third of press conferences (22 January to 26 February 2020).



Supplementary Fig. A.2. Metrics to determine the number of topics in the middle one-third of press conferences (27 February to 7 April 2020).



Supplementary Fig. A.3. Metrics to determine the number of topics in the last one-third of press conferences (8 April to 1 May 2020).

Appendix II

Supplementary Table B.1 Posterior probabilities of terms in each topic in the first one-third of press conferences (22 January to 26 February 2020).

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
1	物资	Supplies	0.012632	4	医疗队	Medical team	0.028135
1	防护服	Protective suit/coverall	0.010212	4	工作	Work	0.019665
1	媒体	Media	0.009151	4	疫情	Epidemic	0.017627
1	湖北	Hubei	0.008012	4	防控	Prevention and control	0.01634
1	口罩	Facial mask	0.007891	4	救治	Treat	0.014166
1	医用	Medical	0.007687	4	医院	Hospital	0.013597
1	医护人员	Medical personnel	0.006683	4	湖北	Hubei	0.013125
1	防护	Protection	0.006674	4	医疗	Medical treatment	0.013007
1	疫情	Epidemic	0.006155	4	肺炎	Pneumonia	0.012989
1	万	Ten thousand	0.005882	4	新型冠状病毒	New coronavirus	0.011917
1	医疗	Medical treatment	0.005209	4	病毒感染	Viral infection	0.011755
1	捐赠	Donate	0.005166	4	武汉	Wuhan	0.009712
1	n	N	0.004571	4	专家	Expert	0.009232
1	网友	Netizen	0.004443	4	支援	Deployment	0.009188
1	我们的	Our	0.003927	4	日	Day	0.009017
1	保障	Assure	0.003717	4	月	Month	0.008847
1	社会各界	Community	0.003437	4	重症	Severe case	0.006185
1	医务人员	Medical staff	0.003424	4	国家	Nation	0.006151
1	标准	Standard	0.003366	4	湖北省	Hubei province	0.006063
1	武汉市	Wuhan	0.003363	4	指挥部	Headquarter	0.005279
1	武汉	Wuhan	0.003073	4	援鄂	Aid Hubei	0.005155
1	护目镜	Goggles	0.003005	4	省	Province	0.004691
1	病毒	Virus	0.003004	4	卫生	Health	0.004578
1	医院	Hospital	0.002798	4	队员	Team members	0.004427
1	国家	Nation	0.002768	4	武汉市	Wuhan	0.004224
1	中央	Central	0.002768	4	荆州	Jingzhou	0.004154
1	紧缺	Shortage	0.002737	4	团队	Team	0.003934
1	消毒	Disinfect	0.002649	4	同济医院	Tongji hospital	0.00367
1	防控	Prevention and control	0.002625	4	新冠肺炎	Coronavirus disease	0.00364
1	支持	Support	0.002617	4	出席	Attend	0.003586
1	时间	Time	0.002473	4	院区	Hospital district	0.003585
1	的问题	The problem	0.002467	4	病区	Ward	0.003543
1	关心	Care	0.002411	4	东院	East campus	0.003502
1	一线	First line	0.00235	4	回答	Answer	0.003398
1	通报	Announce	0.002296	4	派出	Send	0.003229
1	药物	Drug	0.002258	4	健康委	Health committee	0.003005
1	缺口	Gap	0.002179	4	副院长	Associate dean	0.002988
1	研究	Research	0.002175	4	队伍	Team	0.002971
1	日	Day	0.002109	4	人民医院	People's hospital	0.002867
1	心理	Psychology	0.002089	4	黄冈	Huanggang	0.002804
1	短缺	Shortage	0.002052	4	咸宁	Xianning	0.002672
1	关注	Focus on	0.001994	4	支医疗队	Medical team	0.002641
1	需求	Need	0.00198	4	医护人员	Medical personnel	0.002562
1	资源	Resource	0.00198	4	主任	Director	0.00254
1	紧张	Nervous	0.001876	4	呼吸	Breathe	0.002519
1	生产	Production	0.001836	4	对口	Counterpart	0.002459
1	总台	Main station	0.001826	4	院长	Dean	0.002458
1	曹广晶	Cao Guangjing	0.001826	4	会诊	Consultation	0.002458
1	全省	Whole province	0.001816	4	市长	Mayor	0.00245
2	疫情	Epidemic	0.031781	5	物资	Supplies	0.030511
2	防控	Prevention and control	0.030093	5	保障	Assure	0.014869
2	工作	Work	0.014315	5	企业	Enterprise	0.010166
2	社区	Community	0.007829	5	疫情	Epidemic	0.007985
2	武汉	Wuhan	0.007798	5	医疗	Medical treatment	0.007939

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
2	措施	Measures	0.007036	5	防控	Prevention and control	0.007487
2	保障	Assure	0.006511	5	医用	Medical	0.007099
2	市场	Market	0.005435	5	应急	Emergency	0.006756
2	市民	Citizen	0.005391	5	工作	Work	0.005782
2	管理	Manage	0.005173	5	做好	Do well	0.005765
2	全市	Citywide	0.005141	5	需求	Need	0.005529
2	落实	Implement	0.004715	5	支持	Support	0.005373
2	人员	Personnel	0.004669	5	防护	Protection	0.005058
2	省政府	Provincial government	0.004549	5	人员	Personnel	0.005013
2	党中央	Party central	0.004247	5	运输	Transportation	0.004706
2	管控	Control	0.004071	5	省	Province	0.004689
2	小区	Community	0.004045	5	武汉	Wuhan	0.004479
2	省委	Provincial party committee	0.003884	5	医院	Hospital	0.00393
2	实行	Implement	0.003801	5	分配	Distribute	0.003897
2	打赢	Win	0.003786	5	药品	Drug	0.003863
2	习近平总书记	General Secretary Xi Jinping	0.003614	5	重点	Focus	0.003729
2	部署	Deploy	0.003531	5	指挥部	Headquarter	0.003619
2	做好	Do well	0.003464	5	设备	Equipment	0.003601
2	群众	The masses	0.003376	5	生产	Production	0.003521
2	确保	Make sure	0.00332	5	协调	Coordination	0.003462
2	供应	Supply	0.003253	5	全省	Whole province	0.003423
2	阻击战	Blockade	0.003241	5	确保	Make sure	0.003389
2	居民	Resident	0.003197	5	交通	Transportation	0.003055
2	扩散	Spread	0.003184	5	口罩	Facial mask	0.00305
2	蔬菜	Vegetable	0.003036	5	捐赠	Donate	0.002963
2	全省	Whole province	0.002974	5	供应	Supply	0.002928
2	消毒	Disinfect	0.002958	5	防疫	Epidemic prevention	0.002922
2	生活	Life	0.002842	5	措施	Measures	0.002761
2	封闭	Closed	0.002757	5	保证	Guarantee	0.002754
2	武汉市	Wuhan	0.002653	5	解决	Solve	0.002704
2	湖北	Hubei	0.002634	5	方舱	Fangcang Hospital	0.002595
2	国务院	State council	0.002582	5	紧缺	Shortage	0.002556
2	物资	Supplies	0.002451	5	日	Day	0.002537
2	宣传	Publicity	0.002441	5	湖北	Hubei	0.002497
2	日	Day	0.002417	5	统筹	Overall planning	0.002431
2	月	Month	0.00241	5	市州	City state	0.002418
2	责任	Responsibility	0.002343	5	国家	Nation	0.0024
2	组织	Organization	0.002303	5	组织	Organization	0.00238
2	强化	Strengthen	0.002303	5	武汉市	Wuhan	0.002364
2	配送	Delivery	0.002279	5	医疗设备	Medical equipment	0.002322
2	个	One unit	0.002259	5	政策	Policy	0.002292
2	安排	Arrange	0.002238	5	采购	Purchase	0.00229
2	指挥部	Headquarter	0.002139	5	月	Month	0.002257
2	蔓延	Spread	0.00211	5	调度	Scheduling	0.002236
3	患者	Patient	0.032149	6	检测	Detect	0.021911
3	救治	Treat	0.025863	6	患者	Patient	0.016278
3	重症	Severe case	0.022624	6	发热	Fever	0.015352
3	病人	Patient	0.020119	6	隔离	Isolation	0.014592
3	医院	Hospital	0.017489	6	社区	Community	0.012939
3	治疗	Treatment	0.015807	6	排查	Screening	0.011852
3	例	Case	0.013985	6	人员	Personnel	0.011164
3	病例	Case	0.013406	6	病人	Patient	0.009133
3	收治	Admission	0.011934	6	核酸	Nucleic acid	0.008207
3	医疗	Medical treatment	0.009027	6	确诊	Confirmed case	0.00743
3	危重症	Critically ill	0.008819	6	疑似	Suspected	0.007102
3	确诊	Confirmed case	0.008605	6	工作	Work	0.006539
3	诊疗	Diagnosis and treatment	0.007371	6	症状	Symptom	0.006133
3	出院	Discharged	0.006922	6	治疗	Treatment	0.005921
3	发热	Fever	0.006436	6	疫情	Epidemic	0.005434
3	定点医院	Designated hospital	0.005899	6	密切接触者	Close contacts	0.005222

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
3	日	Day	0.005789	6	病毒	Virus	0.005065
3	床位	Bed	0.00571	6	发现	Discover	0.004635
3	肺炎	Pneumonia	0.005576	6	冠状病毒	Coronavirus	0.0046
3	月	Month	0.005532	6	防控	Prevention and control	0.004448
3	资源	Resource	0.004436	6	观察	Observe	0.004265
3	隔离	Isolation	0.004399	6	中医药	Chinese medicine	0.004119
3	家	Family	0.004355	6	管理	Manage	0.003783
3	医护人员	Medical personnel	0.004326	6	门诊	Outpatient	0.003727
3	临床	Clinical	0.004189	6	新型	New type	0.003725
3	提高	Increase	0.004091	6	居家	Home	0.003718
3	轻症	Mild case	0.004067	6	隔离点	Isolation point	0.003714
3	方案	Plan	0.004038	6	日	Day	0.003579
3	医疗机构	Medical institutions	0.004026	6	四类	Four categories	0.003117
3	工作	Work	0.004012	6	能力	Ability	0.003036
3	张	Number of beds	0.003958	6	措施	Measures	0.002904
3	新冠肺炎	Coronavirus disease	0.003932	6	中医	Chinese medicine	0.002859
3	感染	Infect	0.003766	6	传播	Spread	0.002823
3	率	Rate	0.003644	6	体温	Body temperature	0.002772
3	专家	Expert	0.003595	6	疑似病例	Suspected case	0.002753
3	治愈	Cure	0.003574	6	作用	Effect	0.002745
3	门诊	Outpatient	0.003442	6	病例	Case	0.002721
3	病毒感染	Viral infection	0.003409	6	全市	Citywide	0.002685
3	降低	Reduce	0.003367	6	救治	Treat	0.002632
3	疾病	Disease	0.003322	6	武汉	Wuhan	0.00261
3	病区	Ward	0.003296	6	诊断	Diagnosis	0.002518
3	病亡	Died of illness	0.003284	6	月	Month	0.002482
3	武汉市	Wuhan	0.00323	6	筛查	Screening	0.002472
3	病房	Ward	0.003221	6	实行	Implement	0.002472
3	新增	New case	0.003108	6	收治	Admission	0.002471
3	新型冠状病毒	New coronavirus	0.002999	6	临床	Clinical	0.002424
3	定点	Fixed point	0.002924	6	感染	Infect	0.002266
3	累计	Grand total	0.002874	6	中药	Traditional Chinese medicine	0.002266
3	全省	Whole province	0.002851	6	医学观察	Medical observation	0.00225

Supplementary Table B.2 Posterior probabilities of terms in each topic in the middle one-third of press conferences (27 February to 7 April 2020).

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
1	患者	Patient	0.02378	2	占全省	% of the province	0.003603
1	医院	Hospital	0.015117	2	亿元	100 million yuan	0.003311
1	救治	Treat	0.012848	2	出院	Discharged	0.003133
1	医疗	Medical treatment	0.01072	2	全市	Citywide	0.00313
1	重症	Severe case	0.010438	2	重点	Focus	0.003109
1	医疗队	Medical team	0.007881	2	万	Ten thousand	0.003064
1	治疗	Treatment	0.006705	2	生产	Production	0.00306
1	新冠肺炎	Coronavirus disease	0.006401	2	影响	Influence	0.002941
1	日	Day	0.006037	2	新冠肺炎	Coronavirus disease	0.002865
1	病人	Patient	0.006023	2	工作	Work	0.002852
1	工作	Work	0.005977	2	项目	Project	0.002727
1	方舱	Fangcang Hospital	0.005565	2	湖北省	Hubei province	0.002651
1	月	Month	0.005517	2	连续	Continuous	0.002609
1	康复	Recovery	0.004839	2	措施	Measures	0.002559
1	危重症	Critically ill	0.004735	2	需求	Need	0.002544
1	专家	Expert	0.004318	2	做好	Do well	0.002503
1	收治	Admission	0.004182	2	困难	Difficulty	0.002389
1	队员	Team members	0.004088	2	病亡	Died of illness	0.002332
1	出院	Discharged	0.003854	2	人员	Personnel	0.002258
1	疫情	Epidemic	0.003452	2	率	Rate	0.002227
1	护理	Nursing	0.003422	2	加大	Increase	0.002171
1	心理	Psychology	0.003353	2	解决	Solve	0.002154
1	隔离	Isolation	0.003258	2	确保	Make sure	0.002149
1	支援	Deployment	0.003161	2	天	Sky	0.002061
1	管理	Manage	0.003075	3	疫情	Epidemic	0.032801
1	武汉	Wuhan	0.003068	3	防控	Prevention and control	0.026353
1	医护人员	Medical personnel	0.002925	3	工作	Work	0.016948
1	国家	Nation	0.002881	3	湖北	Hubei	0.010381
1	定点医院	Designated hospital	0.002696	3	湖北省	Hubei province	0.008707
1	诊疗	Diagnosis and treatment	0.002694	3	社区	Community	0.008179
1	物资	Supplies	0.002589	3	武汉市	Wuhan	0.007024
1	医疗机构	Medical institutions	0.002558	3	人员	Personnel	0.006149
1	做好	Do well	0.00251	3	指挥部	Headquarter	0.006139
1	保障	Assure	0.002503	3	肺炎	Pneumonia	0.005852
1	病区	Ward	0.002489	3	小区	Community	0.005556
1	就医	Seek medical attention	0.002411	3	日	Day	0.005306
1	院感	Sense of hospital	0.00235	3	副主任	Deputy director	0.005273
1	医务人员	Medical staff	0.00232	3	月	Month	0.005167
1	累计	Grand total	0.002305	3	有序	Orderly	0.004845
1	提高	Increase	0.002299	3	武汉	Wuhan	0.004614
1	发热	Fever	0.002297	3	新冠肺炎	Coronavirus disease	0.004358
1	检测	Detect	0.002252	3	做好	Do well	0.00431
1	感染	Infect	0.002216	3	媒体	Media	0.004073
1	指导	Guide	0.002192	3	通报	Announce	0.003961
1	防控	Prevention and control	0.002176	3	全省	Whole province	0.003935
1	个	One unit	0.002091	3	新型冠状	New coronavirus	0.003852
1	人员	Personnel	0.002074	3	疾病预防控制中心	Centers for disease control and prevention	0.003852
1	方案	Plan	0.002025	3	病毒感染	Viral infection	0.003852
1	团队	Team	0.00197	3	措施	Measures	0.00382
2	企业	Enterprise	0.025741	3	支援	Deployment	0.00376
2	例	Case	0.015921	3	风险	Risk	0.003225
2	日	Day	0.015174	3	管理	Manage	0.003065
2	复工	Resume work	0.014494	3	管控	Control	0.003038
2	月	Month	0.014419	3	医疗队	Medical team	0.002991
2	复产	Resume production	0.009983	3	工作情况	Working condition	0.002879
2	新增	New case	0.009737	3	居民	Resident	0.002855

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
2	全省	Whole province	0.008532	3	省	Province	0.002824
2	疫情	Epidemic	0.008439	3	习 近 平 总 书 记	General Secretary Xi Jinping	0.00277
2	病例	Case	0.007852	3	形势	Situation	0.002575
2	年	Year	0.006821	3	援鄂	Aid Hubei	0.002517
2	确诊	Confirmed case	0.006803	3	恢复	Recover	0.002473
2	就业	Employment	0.006752	3	工作的	Work	0.002441
2	服务	Service	0.005496	3	市	City	0.002434
2	武汉市	Wuhan	0.005331	3	落实	Implement	0.002383
2	政策	Policy	0.005257	3	医疗	Medical treatment	0.002339
2	支持	Support	0.005192	3	卫生	Health	0.002335
2	保障	Assure	0.004924	3	保障	Assure	0.002239
2	累计	Grand total	0.004815	3	返岗	Back to work	0.002163
2	家	Family	0.004808	3	推进	Advance	0.002144
2	时	Time	0.004666	3	排查	Screening	0.002078
2	防控	Prevention and control	0.003809	3	统筹	Overall planning	0.002063
2	物资	Supplies	0.0037	3	回答	Answer	0.002019
2	个	One unit	0.003665	3	通道	Aisle	0.001948
2	落实	Implement	0.003654				

Supplementary Table B.3 Posterior probabilities of terms in each topic in the last one-third of press conferences (8 April to 1 May 2020).

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
1	企业	Enterprise	0.03414	4	复工	Resume work	0.018267
1	支持	Support	0.012634	4	疫情	Epidemic	0.018191
1	亿元	100 million yuan	0.012524	4	就业	Employment	0.016508
1	复工	Resume work	0.010476	4	企业	Enterprise	0.012785
1	政策	Policy	0.010179	4	复产	Resume production	0.011882
1	复产	Resume production	0.008951	4	防控	Prevention and control	0.008551
1	疫情	Epidemic	0.007371	4	服务	Service	0.007124
1	工程	Project	0.007007	4	心理	Psychology	0.006624
1	月	Month	0.006815	4	农产品	Agricultural products	0.005689
1	贷款	Loan	0.006454	4	家	Family	0.00477
1	小微	Micro	0.006401	4	工作	Work	0.004754
1	湖北	Hubei	0.006181	4	支持	Support	0.004597
1	服务	Service	0.005994	4	扶贫	Poverty alleviation	0.004517
1	资金	Funds	0.005702	4	项目	Project	0.004365
1	落实	Implement	0.004889	4	推进	Advance	0.004363
1	项目	Project	0.004864	4	创业	Start a business	0.004296
1	再贷款	Refinance	0.004494	4	全市	Citywide	0.004253
1	建设	Construction	0.004318	4	推动	Promote	0.004243
1	重点	Focus	0.003824	4	影响	Influence	0.004162
1	防控	Prevention and control	0.003706	4	重点	Focus	0.004033
1	全省	Whole province	0.003649	4	产业	Industry	0.003899
1	年	Year	0.003614	4	有序	Orderly	0.003854
1	鄂北	Hubei	0.003344	4	武汉市	Wuhan	0.003719
1	日	Day	0.003143	4	个	One unit	0.003527
1	个	One unit	0.0031	4	政策	Policy	0.003479
1	专项	Special item	0.00304	4	组织	Organization	0.003349
1	金融机构	Financial institutions	0.003031	4	岗位	Post	0.003318
1	银行	Bank	0.003031	4	率	Rate	0.003261
1	保障	Assure	0.002954	4	农民工	Rural migrant workers	0.003112
1	省	Province	0.002932	4	销售	Sales	0.003036
1	解决	Solve	0.002863	4	增值税	Value-added tax	0.003011
1	中小微	Medium, small and micro	0.002862	4	恢复	Recover	0.003005
1	提供	Supply	0.002768	4	科技	Technology	0.002912
1	金融	Finance	0.002733	4	对接	Docking	0.002885
1	需求	Need	0.002578	4	农业生产	Agricultural production	0.002843
1	推动	Promote	0.002526	4	万	Ten thousand	0.002808
1	确保	Make sure	0.002499	4	解决	Solve	0.002742
1	万	Ten thousand	0.002439	4	返岗	Back to work	0.002714
1	工作	Work	0.002396	4	保障	Assure	0.002704
1	活动	Activity	0.002352	4	电商	E-commerce	0.002689
1	加大	Increase	0.002333	4	提供	Supply	0.00267
1	家	Family	0.002327	4	抓	Grasp	0.002577
1	纾困	Bail out	0.002299	4	期间	Period	0.002574
1	措施	Measures	0.002284	4	月	Month	0.002562
1	力度	Strength	0.002277	4	贫困户	Poor households	0.002514
1	协调	Coordination	0.002265	4	做好	Do well	0.002499
1	落地	Landing	0.002249	4	生产	Production	0.002365
1	中央	Central	0.002243	4	春季	Spring	0.002357
1	搬迁	Move	0.002195	4	统筹	Overall planning	0.002345
2	例	Case	0.035503	5	防控	Prevention and control	0.020935
2	日	Day	0.031233	5	疫情	Epidemic	0.017333
2	月	Month	0.028154	5	人员	Personnel	0.01297
2	湖北省	Hubei province	0.021931	5	措施	Measures	0.007677
2	疫情	Epidemic	0.021595	5	工作	Work	0.007603

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
2	全省	Whole province	0.019062	5	管理	Manage	0.007014
2	防控	Prevention and control	0.017346	5	做好	Do well	0.006718
2	病例	Case	0.016174	5	落实	Implement	0.006665
2	武汉市	Wuhan	0.015177	5	检测	Detect	0.006618
2	年	Year	0.014652	5	武汉	Wuhan	0.005334
2	新冠肺炎	Coronavirus disease	0.014624	5	交通	Transportation	0.00513
2	确诊	Confirmed case	0.013892	5	恢复	Recover	0.004963
2	新增 New case		0.013585	5	重点	Focus	0.00493
2	工作	Work	0.011976	5	管控	Control	0.004806
2	肺炎	Pneumonia	0.011695	5	月	Month	0.004686
2	湖北	Hubei	0.010203	5	日	Day	0.004454
2	时	Time	0.009697	5	通道	Aisle	0.004317
2	累计	Grand total	0.008842	5	信息	Information	0.004238
2	副主任	Deputy director	0.00858	5	保障	Assure	0.004206
2	新型冠状病毒	New coronavirus	0.00789	5	应急	Emergency	0.003983
2	病毒感染	Viral infection	0.007791	5	社区	Community	0.003934
2	疾病预防控制中心	Centers for disease control and prevention	0.007101	5	旅客	Traveler	0.003918
2	患者	Patient	0.006471	5	有序	Orderly	0.003891
2	出院	Discharged	0.006016	5	患者	Patient	0.003666
2	无症状	Asymptomatic	0.005859	5	医院	Hospital	0.003663
2	感染者	Infected	0.005856	5	救治	Treat	0.003616
2	通报	Announce	0.005791	5	入境	Entry	0.003421
2	连续	Continuous	0.004982	5	人群	Crowd	0.003395
2	病亡	Died of illness	0.004524	5	核酸	Nucleic acid	0.003357
2	新冠	New coronavirus	0.004388	5	组织	Organization	0.00325
2	治疗	Treatment	0.004152	5	场所	Place	0.003176
2	武汉	Wuhan	0.003987	5	复工	Resume work	0.003176
2	病毒	Virus	0.003934	5	健康	Healthy	0.003163
2	康复	Recovery	0.003743	5	离汉	Leave Wuhan	0.003154
2	重症	Severe case	0.003676	5	风险	Risk	0.00311
2	指挥部	Headquarter	0.003509	5	消毒	Disinfect	0.003091
2	输入	Enter	0.003486	5	体温	Body temperature	0.003013
2	治愈	Cure	0.00345	5	处置	Dispose of	0.003013
2	危重症	Critically ill	0.003309	5	乘客	Passenger	0.003013
2	救治	Treat	0.003267	5	确保	Make sure	0.002994
2	隔离	Isolation	0.003178	5	建立	Establish	0.002915
2	境外	Abroad	0.003139	5	常态化	Normalize	0.002819
2	省	Province	0.003062	5	输入	Enter	0.002804
2	工作情况	Working condition	0.003044	5	防疫	Epidemic prevention	0.002713
2	解除	Relieve	0.002986	5	排查	Screening	0.002637
2	人民政府	People's government	0.002976	5	反弹	Rebound	0.002606
2	恩施州	Enshi prefecture	0.002951	5	医疗	Medical treatment	0.002597
2	报告	Report	0.002872	5	方案	Plan	0.002589
2	地区	Area	0.002871	5	感染者	Infected	0.002575
3	疫情	Epidemic	0.013895	6	办理	Handle	0.009781
3	月	Month	0.013592	6	血液	Blood	0.009021
3	企业	Enterprise	0.010443	6	媒体	Media	0.008501
3	保障	Assure	0.009575	6	疫情	Epidemic	0.00836
3	脱贫	Get rid of poverty	0.008963	6	业务	Business	0.008193
3	职工	Staff	0.007718	6	武汉	Wuhan	0.005905
3	防控	Prevention and control	0.005066	6	血浆	Plasma	0.005787
3	确保	Make sure	0.004904	6	保障	Assure	0.005728
3	政策	Policy	0.004702	6	期间	Period	0.005709
3	影响	Influence	0.004694	6	人员	Personnel	0.005489
3	日	Day	0.004529	6	无偿献血	Blood donation	0.005194
3	帮扶	Support	0.004473	6	健康	Healthy	0.004835
3	标准	Standard	0.004427	6	服务	Service	0.004802
3	发放	Issue	0.004273	6	参加	Join	0.004551
3	万	Ten thousand	0.004185	6	治疗	Treatment	0.003954
3	工作	Work	0.004169	6	临床	Clinical	0.003723
3	返还	Return	0.003948	6	通报	Announce	0.003679
3	扶贫	Poverty alleviation	0.003883	6	发布	Release	0.003622

Topic no.	Chi. term	Eng. term	beta	Topic no.	Chi. term	Eng. term	beta
3	人员	Personnel	0.003813	6	我省	Our province	0.003549
3	个	One unit	0.003705	6	工作	Work	0.003361
3	就业	Employment	0.003693	6	单位	Unit	0.003357
3	攻坚	Tackling	0.003657	6	措施	Measures	0.003321
3	产品	Product	0.003646	6	疟疾	Malaria	0.00328
3	困难	Difficulty	0.003619	6	办	Manage	0.003098
3	工会	Union	0.003536	6	社保	Social security	0.003089
3	稳岗	Stable post	0.003516	6	出行	Travel	0.003068
3	恢复	Recover	0.003478	6	患者	Patient	0.003057
3	临时	Temporary	0.003442	6	群众	The masses	0.003009
3	做好	Do well	0.003334	6	献血	Donate blood	0.00287
3	抓好	Grasp well	0.003237	6	预约	Reserve	0.002851
3	全市	Citywide	0.003197	6	新冠肺炎	Coronavirus disease	0.002831
3	补贴	Subsidy	0.003184	6	申报	Declare	0.002763
3	武汉市	Wuhan	0.003068	6	康复者	Recovered	0.002734
3	救助	Rescue	0.002991	6	延期	Postpone	0.002724
3	致贫	Lead to poverty	0.002991	6	月	Month	0.002661
3	生猪	Pork	0.002991	6	您的	Your	0.00266
3	价格	Price	0.00296	6	实施	Implement	0.002651
3	措施	Measures	0.002942	6	献血者	Blood donor	0.002597
3	旅游	Tourism	0.002923	6	社区	Community	0.002587
3	贫困人口	Population in poverty	0.002897	6	日	Day	0.002582
3	元	Yuan	0.002885	6	提供	Supply	0.002572
3	精准	Precise	0.002878	6	采集	Collection	0.002556
3	低保	Subsistence allowance	0.002871	6	确保	Make sure	0.002535
3	着力	Focus on	0.002859	6	动员	Mobilization	0.002515
3	农资	Agricultural materials	0.002857	6	恢复期	Recovery period	0.002462
3	提高	Increase	0.002806	6	万	Ten thousand	0.002458
3	年	Year	0.00279	6	武汉市	Wuhan	0.002443
3	方式	Way	0.002785	6	全省	Whole province	0.002436
3	参保	Insured	0.002674	6	宣传	Publicity	0.002286

Supplementary Table B.4 Correlations between terms in each topic in the first one-third of press conferences (22 January to 26 February 2020).

Item1	Item2	Pearson r	Item1	Item2	Pearson r
新型冠状病毒 New coronavirus	病毒感染 Viral infection	0.963475	出院 Discharged	康复 Recovery	0.367743
新型 New type	冠状病毒 Coronavirus	0.935456	管控 Control	交通 Transportation	0.366313
新型冠状病毒 New coronavirus	肺炎 Pneumonia	0.832833	例 Case	死亡 Die	0.36346
病毒感染 Viral infection	肺炎 Pneumonia	0.823524	实行 Implement	管理 Manage	0.361904
中法新城 Sino-French new city	院区 Hospital district	0.814887	例 Case	出院 Discharged	0.360854
省政府 Provincial government	省委 Provincial party committee	0.798157	湖北 Hubei	肺炎 Pneumonia	0.359598
24Twenty four	小时 Hour	0.752104	政策 Policy	出台 Introduced	0.357517
卫生 Health	健康委 Health committee	0.740766	治疗 Treatment	患者 Patient	0.356289
打赢 Win	阻击战 Blockade	0.72009	新型冠状病毒 New coronavirus	出席 Attend	0.356151
率 Rate	病亡 Died of illness	0.719945	病毒感染 Viral infection	出席 Attend	0.356151
党中央 Party central	国务院 State council	0.711474	习近平总书记 General Secretary Xi Jinping	指导组 Steering group	0.353954
加大 Increase	力度 Strength	0.709518	新型冠状病毒 New coronavirus	回答 Answer	0.35321
疫情 Epidemic	防控 Prevention and control	0.70646	病毒感染 Viral infection	回答 Answer	0.35321
同济医院 Tongji hospital	院区 Hospital district	0.688341	减少 Reduce	聚集 Gather	0.352056
发热 Fever	门诊 Outpatient	0.664879	建立 Establish	机制 Mechanism	0.351968
口罩 Facial mask	n95N95	0.664069	省政府 Provincial government	部署 Deploy	0.350646
防护服 Protective suit/coverall	n95N95	0.647394	多学科 Multidisciplinary	会诊 Consultation	0.350317
指导组 Steering group	中央 Central	0.634631	新型冠状病毒 New coronavirus	工作 Work	0.350188
口罩 Facial mask	防护服 Protective suit/coverall	0.603648	发热 Fever	留观 Observe	0.349732
检测 Detect	核酸 Nucleic acid	0.60263	健康委 Health committee	国家 Nation	0.348559
同济医院 Tongji hospital	中法新城 Sino-French new city	0.59479	提高 Increase	病亡 Died of illness	0.34847
发挥 Bring into play	作用 Effect	0.594656	医疗 Medical treatment	资源 Resource	0.348457
治愈率 Cure rate	率 Rate	0.582828	病毒感染 Viral infection	工作 Work	0.346619
人民医院 People's hospital	东院 East campus	0.582084	社区 Community	居民 Resident	0.344474
医生 Doctor	护士 Nurse	0.564054	肺炎 Pneumonia	工作 Work	0.342622
封闭 Closed	小区 Community	0.557965	指挥部 Headquarter	前方 Ahead	0.342439
省市 Province	兄弟 Brother	0.553872	咸宁市 Xianning	咸宁 Xianning	0.341157
出席 Attend	回答 Answer	0.548429	患者 Patient	收治 Admission	0.340522
率 Rate	降低 Reduce	0.547338	中医 Chinese medicine	中医药 Chinese medicine	0.340139
诊疗 Diagnosis and treatment	方案 Plan	0.539152	副省长 Deputy governor	出席 Attend	0.339938
治愈 Cure	出院 Discharged	0.523791	国务院 State council	习近平总书记 General Secretary Xi Jinping	0.338483
治愈率 Cure rate	降低 Reduce	0.5225	重症 Severe case	轻症 Mild case	0.335365
提高 Increase	治愈率 Cure rate	0.520528	省 Province	指挥部 Headquarter	0.333966
医用 Medical	n95N95	0.492273	病区 Ward	接管 Take over	0.333467
重症 Severe case	危重症 Critically ill	0.492233	党中央 Party central	打赢 Win	0.332882
床位 Bed	张 Number of beds	0.481322	习近平总书记 General Secretary Xi Jinping	省委 Provincial party committee	0.332251

Item1	Item2	Pearson r	Item1	Item2	Pearson r
医用 Medical	防护服 Protective suit/coverall	0.481227	省政府 Provincial government	党中央 Party central	0.331782
密切接触者 Close contacts	医学观察 Medical observation	0.48003	国务院 State council	省委 Provincial party committee	0.331332
降低 Reduce	病亡 Died of illness	0.471923	建设 Construction	方舱 Fangcang Hospital	0.330978
治愈率 Cure rate	病亡 Died of illness	0.462908	联合 Joint	会诊 Consultation	0.330632
提高 Increase	率 Rate	0.46121	留观 Observe	疑似病例 Suspected case	0.330197
物资 Supplies	医用 Medical	0.455735	供应 Supply	蔬菜 Vegetable	0.329767
保障 Assure	物资 Supplies	0.453591	省政府 Provincial government	国务院 State council	0.328936
病例 Case	确诊 Confirmed case	0.452501	党中央 Party central	省委 Provincial party committee	0.328467
党中央 Party central	习近平总书记 General Secretary Xi Jinping	0.451192	服务 Service	提供 Supply	0.328192
救治 Treat	患者 Patient	0.449	隔离 Isolation	观察 Observe	0.328143
防控 Prevention and control	工作 Work	0.448684	省政府 Provincial government	习近平总书记 General Secretary Xi Jinping	0.328051
人民医院 People's hospital	武汉大学 Wuhan university	0.44706	病例 Case	疑似病例 Suspected case	0.327536
重症 Severe case	患者 Patient	0.446103	村 Village	小区 Community	0.327515
口罩 Facial mask	医用 Medical	0.441902	联合 Joint	专家组 Expert group	0.327313
确诊 Confirmed case	疑似病例 Suspected case	0.436432	管控 Control	一律 Always	0.323723
企业 Enterprise	生产 Production	0.434497	病例 Case	死亡 Die	0.323497
媒体 Media	通报 Announce	0.430815	接受 Accept	捐赠 Donate	0.323489
确诊 Confirmed case	疑似 Suspected	0.424287	肺炎 Pneumonia	回答 Answer	0.322479
提高 Increase	降低 Reduce	0.421953	保障 Assure	生活 Life	0.321811
例 Case	治愈 Cure	0.420551	国家 Nation	卫健委 Health commission	0.32159
医疗队 Medical team	援鄂 Aid Hubei	0.420252	储备 Reserve	蔬菜 Vegetable	0.320874
湖北 Hubei	新型冠状病毒 New coronavirus	0.417531	隔离 Isolation	密切接触者 Close contacts	0.320808
新型冠状病毒 New coronavirus	防控 Prevention and control	0.416231	运输 Transportation	交通 Transportation	0.320447
湖北 Hubei	病毒感染 Viral infection	0.412884	肺炎 Pneumonia	出席 Attend	0.318171
病毒感染 Viral infection	防控 Prevention and control	0.412686	隔离 Isolation	发热 Fever	0.317928
扩散 Spread	蔓延 Spread	0.410133	疑似 Suspected	四类 Four categories	0.317819
习近平总书记 General Secretary Xi Jinping	部署 Deploy	0.406757	医院 Hospital	方舱 Fangcang Hospital	0.317292
防护服 Protective suit/coverall	紧缺 Shortage	0.405981	供应 Supply	企业 Enterprise	0.316448
重症 Severe case	救治 Treat	0.401657	对口 Counterpart	前方 Ahead	0.316145
救治 Treat	医疗 Medical treatment	0.401523	企业 Enterprise	省内 In the province	0.315259
紧缺 Shortage	n95N95	0.400899	社区 Community	党员干部 Party members and cadres	0.31456
应急 Emergency	运输 Transportation	0.400336	区域 Area	中心 Center	0.31455
医用 Medical	紧缺 Shortage	0.398726	门诊 Outpatient	家 Family	0.314083
疾病 Disease	基础 Base	0.398608	累计 Grand total	治愈 Cure	0.313852
肺炎 Pneumonia	防控 Prevention and control	0.394364	物资 Supplies	防护服 Protective suit/coverall	0.312707
疫情 Epidemic	工作 Work	0.394241	支援 Deployment	医疗队 Medical team	0.312199
定点 Fixed point	医疗机构 Medical institutions	0.391038	检测 Detect	能力 Ability	0.311334
早 Morning	诊断 Diagnosis	0.388757	救治 Treat	专家 Expert	0.310684

Item1	Item2	Pearson r	Item1	Item2	Pearson r
区 Area	东院 East campus	0.387217	人员 Personnel	四类 Four categories	0.310173
武汉大学 Wuhan university	东院 East campus	0.387043	累计 Grand total	接受 Accept	0.310034
引导 Guide	宣传 Publicity	0.386424	观察 Observe	发热 Fever	0.310018
累计 Grand total	例 Case	0.383074	隔离 Isolation	居家 Home	0.309927
发热 Fever	排查 Screening	0.381631	排查 Screening	社区 Community	0.309461
报告 Report	例 Case	0.380418	病人 Patient	发热 Fever	0.308842
下一步 Next step	我们将 We will	0.380292	共有 Share	医疗队 Medical team	0.30839
新型冠状病毒 New coronavirus	疫情 Epidemic	0.376508	保障 Assure	供应 Supply	0.307691
对口 Counterpart	支援 Deployment	0.376479	采购 Purchase	供应 Supply	0.307361
省委 Provincial party committee	部署 Deploy	0.376346	社区 Community	村 Village	0.304282
病例 Case	例 Case	0.375694	报告 Report	治愈 Cure	0.30396
肺炎 Pneumonia	疫情 Epidemic	0.373201	党中央 Party central	阻击战 Blockade	0.303933
病毒感染 Viral infection	疫情 Epidemic	0.373148	隔离点 Isolation point	方舱 Fangcang Hospital	0.30381
能力 Ability	提升 Promote	0.372839	治疗 Treatment	重症 Severe case	0.302729
管理 Manage	封闭 Closed	0.372426	密切接触者 Close contacts	发热 Fever	0.300679
物资 Supplies	紧缺 Shortage	0.372392	供应 Supply	生产 Production	0.300033
党中央 Party central	部署 Deploy	0.368421			

Supplementary Table B.5 Correlations between terms in each topic in the middle one-third of press conferences (27 February to 7 April 2020).

Item1	Item2	Pearson r	Item1	Item2	Pearson r
仍在 Still	院 Hospital	0.925573	病例 Case	74%0.74	0.39415
26%0.26	74%0.74	0.920005	给予 Give	补贴 Subsidy	0.393695
复工 Resume work	复产 Resume production	0.88123	确诊 Confirmed case	市州 City state	0.393564
副主任 Deputy director	疾病预防控制中心 Centers for disease control and prevention	0.846024	累计 Grand total	3 月 March	0.393446
新冠 New coronavirus	病毒 Virus	0.82577	指挥部 Headquarter	场 Field	0.392894
关口 Pass	前移 Move forward	0.802838	2020 年 2020 year	仍在 Still	0.391716
例 Case	2020 年 2020 year	0.782617	2020 年 2020 year	26%0.26	0.391716
新型冠状 New coronavirus	肺炎 Pneumonia	0.771297	机制 Mechanism	建立 Establish	0.391019
病毒感染 Viral infection	肺炎 Pneumonia	0.771297	肺炎 Pneumonia	场 Field	0.390371
脱贫 Get rid of poverty	攻坚 Tackling	0.744492	发热 Fever	门诊 Outpatient	0.39034
新冠 New coronavirus	场 Field	0.742061	封闭 Closed	小区 Community	0.388973
确诊 Confirmed case	病例 Case	0.737242	例 Case	仍在 Still	0.388399
省委 Provincial party committee	省政府 Provincial government	0.73581	例 Case	26%0.26	0.388399
病毒 Virus	场 Field	0.734445	社区 Community	小区 Community	0.386324
紧急 Urgent	救援队 Rescue team	0.734302	新型冠状 New coronavirus	防控 Prevention and control	0.386323
0 时 0 o'clock	境外 Abroad	0.730221	病毒感染 Viral infection	防控 Prevention and control	0.386323
检测 Detect	核酸 Nucleic acid	0.712308	新型冠状 New coronavirus	工作 Work	0.38566
24Twenty four	小时 Hour	0.708243	病毒感染 Viral infection	工作 Work	0.38566
报告 Report	74%0.74	0.705561	支援 Deployment	前方 Ahead	0.385573
心理 Psychology	疏导 Unblock	0.703929	重症 Severe case	院 Hospital	0.384121
报告 Report	26%0.26	0.694163	肺炎 Pneumonia	回答 Answer	0.383408
治愈 Cure	出院 Discharged	0.693222	肺炎 Pneumonia	新冠 New coronavirus	0.382247
医学 Medicine	救援队 Rescue team	0.683329	例 Case	院 Hospital	0.382131
疫情 Epidemic	防控 Prevention and control	0.668778	24 时 24 o'clock	连续 Continuous	0.380579
全 Complete	覆盖 Cover	0.659433	国家 Nation	救援队 Rescue team	0.380156
加大 Increase	力度 Strength	0.659304	患者 Patient	医院 Hospital	0.378931
习近平总书记 General Secretary Xi Jinping	贯彻落实 Implement	0.656895	重症 Severe case	仍在 Still	0.37788
重症 Severe case	危重症 Critically ill	0.653264	确诊 Confirmed case	0 例 0 cases	0.376353
占全省% of the province	74%0.74	0.647552	医疗队 Medical team	援鄂 Aid Hubei	0.375962
连续 Continuous	病例数 Number of cases	0.643376	病例 Case	市州 City state	0.375059
24 时 24 o'clock	0 时 0 o'clock	0.63973	疫情 Epidemic	工作 Work	0.375001
市州 City state	74%0.74	0.632008	新增 New case	占全省% of the province	0.374566
处置 Dispose of	废物 Waste	0.627093	经济社会发展 Economic growth	统筹 Overall planning	0.374312
确诊 Confirmed case	24 时 24 o'clock	0.624287	党中央 Party central	贯彻落实 Implement	0.373638
市州 City state	26%0.26	0.621712	病例 Case	26%0.26	0.373601

Item1	Item2	Pearson r	Item1	Item2	Pearson r
卫生 Health	健康委员会 Health committee	0.609279	确诊 Confirmed case	境外 Abroad	0.373461
新增 New case	2020 年 2020 year	0.605449	2020 年 2020 year	院 Hospital	0.372601
例 Case	占全省% of the province	0.601612	输入 Enter	境外 Abroad	0.37191
2020 年 2020 year	占全省% of the province	0.597813	2020 年 2020 year	病例数 Number of cases	0.37187
累计 Grand total	例 Case	0.596449	占全省% of the province	3 月 March	0.370369
占全省% of the province	26%0.26	0.59496	病例 Case	0 时 0 o'clock	0.369806
通道 Aisle	离鄂 Leave Hubei	0.58774	服务 Service	提供 Supply	0.369644
形势 Situation	向好 For the better	0.578325	密切接触者 Close contacts	发热 Fever	0.368274
回答 Answer	疾病预防控制中心 Centers for disease control and prevention	0.573555	例 Case	0 例 0 cases	0.368118
医学 Medicine	紧急 Urgent	0.572095	降低 Reduce	病亡 Died of illness	0.367332
累计 Grand total	占全省% of the province	0.566177	肺炎 Pneumonia	病毒 Virus	0.366624
春耕 Spring ploughing	农资 Agricultural materials	0.564355	习近平总书记 General Secretary Xi Jinping	党中央 Party central	0.36586
发挥 Bring into play	作用 Effect	0.561911	新冠肺炎 Coronavirus disease	24 时 24 o'clock	0.365248
对口 Counterpart	支援 Deployment	0.561776	收治 Admission	患者 Patient	0.364681
秩序 Order	恢复正常 Back to normal	0.558358	解除 Relieve	通道 Aisle	0.364201
返岗 Back to work	点对点 Point to point	0.550623	湖北省 Hubei province	24 时 24 o'clock	0.363733
例 Case	新增 New case	0.549891	医院 Hospital	雷神山 Leishenshan Hospital	0.363187
稳岗 Stable post	返还 Return	0.548442	封闭 Closed	管理 Manage	0.363116
24 时 24 o'clock	74%0.74	0.546274	门诊 Outpatient	接种 Vaccination	0.362646
同济医院 Tongji hospital	院区 Hospital district	0.544921	指挥部 Headquarter	新冠 New coronavirus	0.361846
0 时 0 o'clock	连续 Continuous	0.544261	累计 Grand total	26%0.26	0.361804
病例 Case	24 时 24 o'clock	0.540278	新增 New case	3 月 March	0.360228
24 时 24 o'clock	26%0.26	0.537248	新增 New case	武汉市 Wuhan	0.360054
湖北 Hubei	新型冠状 New coronavirus	0.53711	等级 Grade	分区 Partition	0.359861
湖北 Hubei	病毒感染 Viral infection	0.53711	护理 Nursing	队 Team	0.359653
例 Case	3 月 March	0.530193	累计 Grand total	报告 Report	0.359219
病例 Case	新增 New case	0.530067	指挥部 Headquarter	病毒 Virus	0.357706
24 时 24 o'clock	2020 年 2020 year	0.527484	解除 Relieve	管控 Control	0.357346
连续 Continuous	境外 Abroad	0.52558	地区 Area	连续 Continuous	0.356545
报告 Report	市州 City state	0.523569	网上 Online	招聘 Recruitment	0.356414
方舱 Fangcang Hospital	江汉 Jianghan	0.523361	成立 Established	专班 Special class	0.356325
副主任 Deputy director	回答 Answer	0.522957	务工人员 Migrant workers	外出 Go out	0.355723
病例 Case	占全省% of the province	0.520785	部署 Deploy	省委 Provincial party committee	0.354075
鄂州 Ezhou	贵州 Guizhou	0.517283	新增 New case	境外 Abroad	0.353849
危重症 Critically ill	院 Hospital	0.512787	2020 年 2020 year	连续 Continuous	0.353506
24 时 24 o'clock	报告 Report	0.509552	轻症 Mild case	关口 Pass	0.352814
2020 年 2020 year	3 月 March	0.50879	24 时 24 o'clock	3 月 March	0.352022

Item1	Item2	Pearson r	Item1	Item2	Pearson r
占全省% of the province	市州 City state	0.504501	资金 Funds	亿元 100 million yuan	0.351839
危重症 Critically ill	仍在 Still	0.504062	24 时 24 o'clock	新增 New case	0.3517
病例 Case	例 Case	0.501785	流调 Flow	调查 Survey	0.349773
监利 Jianli	小龙虾 Crayfish	0.501702	团队 Team	多学科 Multidisciplinary	0.349074
报告 Report	占全省% of the province	0.500489	防护 Protection	物资 Supplies	0.347327
口罩 Facial mask	防护服 Protective suit/coverall	0.497758	卫生 Health	副主任 Deputy director	0.346739
通报 Announce	最新 Up to date	0.496047	下沉 Sink	干部 Cadre	0.345852
病例 Case	2020 年 2020 year	0.494878	康复 Recovery	出院 Discharged	0.345088
新增 New case	连续 Continuous	0.494628	鄂州市 Ezhou city	贵州 Guizhou	0.343351
受 By	影响 Influence	0.490634	前方 Ahead	指挥部 Headquarter	0.342451
新增 New case	0 时 0 o'clock	0.489888	鄂州市 Ezhou city	鄂州 Ezhou	0.341988
湖北省 Hubei province	疾病预防控制中心 Centers for disease control and prevention	0.488075	患者 Patient	康复 Recovery	0.341834
复工 Resume work	企业 Enterprise	0.487326	分类 Classification	分区 Partition	0.340993
就业 Employment	稳岗 Stable post	0.485006	肺炎 Pneumonia	疫情 Epidemic	0.340606
救治 Treat	医疗 Medical treatment	0.484628	居民 Resident	志愿者 Volunteer	0.339796
提高 Increase	治愈率 Cure rate	0.48356	病例 Case	0 例 0 cases	0.339429
累计 Grand total	2020 年 2020 year	0.483313	等级 Grade	评估 Evaluate	0.339121
率 Rate	病亡 Died of illness	0.482625	报告 Report	例 Case	0.338678
确诊 Confirmed case	连续 Continuous	0.482544	社区 Community	村 Village	0.337344
2020 年 2020 year	0 例 0 cases	0.482253	治愈 Cure	病例 Case	0.336827
24 时 24 o'clock	市州 City state	0.480321	病例 Case	3 月 March	0.336823
企业 Enterprise	复产 Resume production	0.475842	病亡 Died of illness	新增 New case	0.336812
副主任 Deputy director	湖北省 Hubei province	0.475786	形势 Situation	变化 Variety	0.336648
24 时 24 o'clock	例 Case	0.474636	病例 Case	武汉市 Wuhan	0.336018
员工 Staff	返岗 Back to work	0.474621	病例 Case	境外 Abroad	0.334605
病例数 Number of cases	境外 Abroad	0.47243	治愈 Cure	新增 New case	0.334242
24 时 24 o'clock	0 例 0 cases	0.466349	救治 Treat	危重症 Critically ill	0.332698
率 Rate	治愈率 Cure rate	0.465888	例 Case	全省 Whole province	0.332245
治疗 Treatment	重症 Severe case	0.465648	销售 Sales	小龙虾 Crayfish	0.331602
24 时 24 o'clock	境外 Abroad	0.464836	秩序 Order	恢复 Recover	0.329986
确诊 Confirmed case	0 时 0 o'clock	0.464699	提高 Increase	降低 Reduce	0.328244
地区 Area	0 时 0 o'clock	0.463502	作用 Effect	充分发挥 Fully use	0.326098
新增 New case	病例数 Number of cases	0.462373	例 Case	市州 City state	0.325637
医院 Hospital	方舱 Fangcang Hospital	0.461138	支持 Support	金融 Finance	0.325439
病例 Case	连续 Continuous	0.458851	定点 Fixed point	医疗机构 Medical institutions	0.325332
病房 Ward	icu ICU	0.457708	环境 Environment	消杀 Kill	0.325173
确诊 Confirmed case	新增 New case	0.454163	对口 Counterpart	前方 Ahead	0.323871
患者 Patient	重症 Severe case	0.453176	医用 Medical	口罩 Facial mask	0.323429
岗位 Post	招聘 Recruitment	0.452603	发放 Issue	贷款 Loan	0.322151

Item1	Item2	Pearson r	Item1	Item2	Pearson r
小区 Community	居民 Resident	0.452363	扶贫 Poverty alleviation	脱贫 Get rid of poverty	0.321968
0 时 0 o'clock	病例数 Number of cases	0.452227	24 时 24 o'clock	病例数 Number of cases	0.321912
确诊 Confirmed case	病例数 Number of cases	0.45139	累计 Grand total	24 时 24 o'clock	0.321829
治疗 Treatment	仍在 Still	0.449952	确诊 Confirmed case	累计 Grand total	0.320775
0 例 0 cases	0 时 0 o'clock	0.449939	患者 Patient	出院 Discharged	0.319581
确诊 Confirmed case	2020 年 2020 year	0.447736	防护 Protection	医用 Medical	0.31954
24 时 24 o'clock	占全省% of the province	0.445854	病亡 Died of illness	例 Case	0.31916
地区 Area	境外 Abroad	0.444655	优势 Advantage	充分发挥 Fully use	0.31867
风险 Risk	等级 Grade	0.443573	患者 Patient	诊疗 Diagnosis and treatment	0.318411
确诊 Confirmed case	例 Case	0.443526	治愈 Cure	占全省% of the province	0.318311
武汉市 Wuhan	占全省% of the province	0.443308	新增 New case	全省 Whole province	0.317938
治疗 Treatment	院 Hospital	0.443104	14 天 14 days	境外 Abroad	0.31788
确诊 Confirmed case	占全省% of the province	0.4426	会诊 Consultation	多学科 Multidisciplinary	0.316301
救治 Treat	患者 Patient	0.442035	0 例 0 cases	连续 Continuous	0.316257
防控 Prevention and control	工作 Work	0.43955	浙江 Zhejiang	荆门 Jingmen	0.316174
健康委员会 Health committee	副主任 Deputy director	0.438876	密切接触者 Close contacts	流调 Flow	0.315752
治疗 Treatment	危重症 Critically ill	0.438864	国家 Nation	紧急 Urgent	0.315043
下一步 Next step	我们将 We will	0.437331	患者 Patient	治疗 Treatment	0.314826
管控 Control	离鄂 Leave Hubei	0.437191	需求 Need	就医 Seek medical attention	0.314733
解除 Relieve	离鄂 Leave Hubei	0.433423	新型冠状 New coronavirus	疫情 Epidemic	0.314399
新型冠状 New coronavirus	回答 Answer	0.432669	病毒感染 Viral infection	疫情 Epidemic	0.314399
病毒感染 Viral infection	回答 Answer	0.432669	指挥部 Headquarter	省 Province	0.314367
非新冠 Not new coronavirus	就医 Seek medical attention	0.432524	市 City	县 County	0.314142
部署 Deploy	党中央 Party central	0.431985	2020 年 2020 year	境外 Abroad	0.313691
累计 Grand total	治愈 Cure	0.428845	密切接触者 Close contacts	隔离 Isolation	0.313013
降低 Reduce	治愈率 Cure rate	0.426281	8 日 8th	4 月 April	0.312672
病亡 Died of illness	治愈率 Cure rate	0.426281	社区 Community	志愿者 Volunteer	0.312532
医用 Medical	防护服 Protective suit/coverall	0.425857	疾病 Disease	基础 Base	0.312199
提高 Increase	率 Rate	0.424772	金融 Finance	贷款 Loan	0.312074
肺炎 Pneumonia	工作 Work	0.424295	天 Sky	连续 Continuous	0.311975
病例 Case	报告 Report	0.424198	元 Yuan	补贴 Subsidy	0.311593
2020 年 2020 year	0 时 0 o'clock	0.423472	条 Strip	政策措施 Policy measures	0.311071
确诊 Confirmed case	74%0.74	0.422575	农村 Rural area	农业 Agriculture	0.311071
确诊 Confirmed case	报告 Report	0.421791	部署 Deploy	省政府 Provincial government	0.310666
点对点 Point to point	务工人员 Migrant workers	0.421265	危重症 Critically ill	例 Case	0.309421
物资 Supplies	医用 Medical	0.42033	出院 Discharged	例 Case	0.309421
新增 New case	0 例 0 cases	0.419579	就业 Employment	创业 Start a business	0.309315

Item1	Item2	Pearson r	Item1	Item2	Pearson r
救治 Treat	重症 Severe case	0.418054	0 例 0 cases	境外 Abroad	0.309143
例 Case	武汉市 Wuhan	0.41717	14 天 14 days	超过 Exceed	0.308488
累计 Grand total	病例 Case	0.415302	社区 Community	居民 Resident	0.308352
肺炎 Pneumonia	防控 Prevention and control	0.41438	困难 Difficulty	群体 Group	0.307564
发放 Issue	万元 Ten thousand yuan	0.414197	省政府 Provincial government	党中央 Party central	0.307215
管控 Control	通道 Aisle	0.413345	企业 Enterprise	政策 Policy	0.306875
湖北 Hubei	肺炎 Pneumonia	0.41307	全省 Whole province	仍在 Still	0.306455
累计 Grand total	新增 New case	0.411878	人员 Personnel	流动 Flow	0.306243
方案 Plan	诊疗 Diagnosis and treatment	0.41092	全省 Whole province	最新 Up to date	0.306032
襄阳 Xiangyang	市 City	0.410839	确诊 Confirmed case	3 月 March	0.305775
出台 Introduced	政策 Policy	0.40978	武汉市 Wuhan	3 月 March	0.305544
全省 Whole province	2020 年 2020 year	0.409741	销售 Sales	香菇 Mushroom	0.305493
病例 Case	病例数 Number of cases	0.407657	下沉 Sink	志愿者 Volunteer	0.304559
率 Rate	降低 Reduce	0.406433	14 天 14 days	0 时 0 o'clock	0.304076
中医 Chinese medicine	中医药 Chinese medicine	0.405778	疑似 Suspected	发热 Fever	0.303696
累计 Grand total	出院 Discharged	0.401765	治疗 Treatment	中西医结合 Integrated Chinese and western medicine	0.303546
向好 For the better	变化 Variety	0.40088	天 Sky	病例数 Number of cases	0.303329
确诊 Confirmed case	26%0.26	0.400747	支持 Support	政策 Policy	0.302783
武汉市 Wuhan	2020 年 2020 year	0.39981	销售 Sales	农产品 Agricultural products	0.302705
返岗 Back to work	务工人员 Migrant workers	0.399259	市 City	区 Area	0.30209
2020 年 2020 year	74%0.74	0.398675	防控 Prevention and control	指挥部 Headquarter	0.302008
小区 Community	封控 Censorship	0.396647	病亡 Died of illness	累计 Grand total	0.301788
累计 Grand total	武汉市 Wuhan	0.395534	全省 Whole province	0 时 0 o'clock	0.301036
累计 Grand total	74%0.74	0.395312	全省 Whole province	院 Hospital	0.300841
例 Case	74%0.74	0.395312	2020 年 2020 year	市州 City state	0.300728
轻症 Mild case	前移 Move forward	0.394848	家 Family	亿元 100 million yuan	0.300463
治愈 Cure	例 Case	0.394322	报告 Report	2020 年 2020 year	0.300342

Supplementary Table B.6 Correlations between terms in each topic in the last one-third of press conferences (8 April to 1 May 2020).

Item1	Item2	Pearson r	Item1	Item2	Pearson r
新型冠状病毒 New coronavirus	病毒感染 Viral infection	0.980202	确诊 Confirmed case	市州 City state	0.396292
无症状 Asymptomatic	感染者 Infected	0.948377	湖北省 Hubei province	24 时 24 o'clock	0.394623
疾病预防控制中心 Centers for disease control and prevention	副主任 Deputy director	0.934826	病例 Case	市州 City state	0.392865
复工 Resume work	复产 Resume production	0.89347	职工 Staff	工会 Union	0.390973
病毒感染 Viral infection	肺炎 Pneumonia	0.779963	24 时 24 o'clock	输入 Enter	0.389473
新冠 New coronavirus	病毒 Virus	0.778419	新增 New case	无症状 Asymptomatic	0.389255
加大 Increase	力度 Strength	0.775468	治疗 Treatment	血浆 Plasma	0.388783
新型冠状病毒 New coronavirus	肺炎 Pneumonia	0.774607	病例 Case	境外 Abroad	0.386193
2020 年 2020 year	例 Case	0.773077	0 例 0 cases	隔离 Isolation	0.385778
24 时 24 o'clock	确诊 Confirmed case	0.76602	新增 New case	感染者 Infected	0.384729
治愈 Cure	出院 Discharged	0.751737	我们将 We will	下一步 Next step	0.384621
24 时 24 o'clock	病例 Case	0.735975	0 例 0 cases	境外 Abroad	0.38178
重症 Severe case	危重症 Critically ill	0.728758	0 例 0 cases	无症状 Asymptomatic	0.38178
离汉 Leave Wuhan	通道 Aisle	0.702115	能力 Ability	提升 Promote	0.380988
脱贫 Get rid of poverty	攻坚 Tackling	0.691059	2020 年 2020 year	0 时 0 o'clock	0.380562
核酸 Nucleic acid	检测 Detect	0.684046	4 月 April	全省 Whole province	0.379504
0 时 0 o'clock	连续 Continuous	0.679314	救治 Treat	患者 Patient	0.37945
发挥 Bring into play	作用 Effect	0.678927	企业 Enterprise	小微 Micro	0.378715
境外 Abroad	输入 Enter	0.675843	新型冠状病毒 New coronavirus	防控 Prevention and control	0.378098
新增 New case	0 例 0 cases	0.674337	0 例 0 cases	感染者 Infected	0.377459
确诊 Confirmed case	病例 Case	0.666911	例 Case	转 Change	0.377309
0 时 0 o'clock	地区 Area	0.655054	0 例 0 cases	病亡 Died of illness	0.376264
24 时 24 o'clock	0 时 0 o'clock	0.654043	病毒感染 Viral infection	防控 Prevention and control	0.375204
2020 年 2020 year	新增 New case	0.650712	政策 Policy	支持 Support	0.374366
无症状 Asymptomatic	转 Change	0.6462	重症 Severe case	患者 Patient	0.37326
病毒 Virus	场 Field	0.643788	农业 Agriculture	农村 Rural area	0.373179
2020 年 2020 year	0 例 0 cases	0.641339	确诊 Confirmed case	境外 Abroad	0.372578
累计 Grand total	例 Case	0.639848	企业 Enterprise	支持 Support	0.369589
疫情 Epidemic	防控 Prevention and control	0.639692	农业生产 Agricultural production	农资 Agricultural materials	0.368904
感染者 Infected	转 Change	0.639494	肺炎 Pneumonia	病毒 Virus	0.367925
转 Change	隔离 Isolation	0.626661	肺炎 Pneumonia	疫情 Epidemic	0.36781
0 时 0 o'clock	境外 Abroad	0.619638	例 Case	出院 Discharged	0.366225
报告 Report	市州 City state	0.607714	全省 Whole province	例 Case	0.366128
确诊 Confirmed case	0 例 0 cases	0.598436	解除 Relieve	管控 Control	0.365903
4 月 April	例 Case	0.597709	临时 Temporary	标准 Standard	0.365424
4 月 April	2020 年 2020 year	0.594518	防疫 Epidemic prevention	物资 Supplies	0.364929
解除 Relieve	转 Change	0.589209	累计 Grand total	新增 New case	0.36486

Item1	Item2	Pearson r	Item1	Item2	Pearson r
0 时 0 o'clock	0 例 0 cases	0.586707	医院 Hospital	患者 Patient	0.364796
无症状 Asymptomatic	隔离 Isolation	0.584748	24 时 24 o'clock	累计 Grand total	0.364196
湖北 Hubei	病毒感染 Viral infection	0.579397	病例 Case	地区 Area	0.361539
感染者 Infected	隔离 Isolation	0.578529	解除 Relieve	0 例 0 cases	0.361345
指挥部 Headquarter	场 Field	0.575741	累计 Grand total	报告 Report	0.361066
湖北 Hubei	新型冠状 New coronavirus	0.575132	报告 Report	例 Case	0.360651
2020 年 2020 year	确诊 Confirmed case	0.573647	确诊 Confirmed case	隔离 Isolation	0.359986
境外 Abroad	连续 Continuous	0.57134	累计 Grand total	市州 City state	0.359186
新冠 New coronavirus	场 Field	0.570955	扶贫 Poverty alleviation	消费 Consumption	0.359099
0 时 0 o'clock	输入 Enter	0.567257	人员 Personnel	体温 Body temperature	0.358704
办理 Handle	业务 Business	0.565901	攻坚 Tackling	贫困人口 Population in poverty	0.358077
例 Case	新增 New case	0.564429	责任 Responsibility	主体 Main body	0.355951
2020 年 2020 year	病例 Case	0.560871	4 月 April	8 日 8th	0.353214
地区 Area	连续 Continuous	0.556455	新冠肺炎 Coronavirus disease	病例 Case	0.352717
全省 Whole province	0 例 0 cases	0.553988	落实 Implement	责任 Responsibility	0.349479
解除 Relieve	离汉 Leave Wuhan	0.543237	治疗 Treatment	患者 Patient	0.348976
2020 年 2020 year	24 时 24 o'clock	0.541977	确诊 Confirmed case	地区 Area	0.348772
治疗 Treatment	重症 Severe case	0.539525	临床 Clinical	血浆 Plasma	0.348335
24 时 24 o'clock	连续 Continuous	0.534035	元 Yuan	标准 Standard	0.347809
参加 Join	发布 Release	0.532444	新增 New case	境外 Abroad	0.346847
确诊 Confirmed case	0 时 0 o'clock	0.528333	脱贫 Get rid of poverty	帮扶 Support	0.346279
治疗 Treatment	危重症 Critically ill	0.527077	办理 Handle	延期 Postpone	0.34625
就业 Employment	岗位 Post	0.519834	24 时 24 o'clock	新增 New case	0.345594
稳岗 Stable post	返还 Return	0.512231	血液 Blood	无偿献血 Blood donation	0.345179
离汉 Leave Wuhan	管控 Control	0.511465	例 Case	市州 City state	0.344957
肺炎 Pneumonia	工作 Work	0.509768	肺炎 Pneumonia	新冠 New coronavirus	0.344357
确诊 Confirmed case	新增 New case	0.509338	保供 Guarantee	粮油 Grain and oil	0.344018
确诊 Confirmed case	例 Case	0.506487	扶贫 Poverty alleviation	贫困户 Poor households	0.343226
境外 Abroad	地区 Area	0.506418	疫情 Epidemic	期间 Period	0.342961
副主任 Deputy director	湖北省 Hubei province	0.503612	就业 Employment	贫困户 Poor households	0.341759
0 例 0 cases	转 Change	0.49974	疫情 Epidemic	工作 Work	0.340821
解除 Relieve	通道 Aisle	0.499053	通报 Announce	媒体 Media	0.340104
24 时 24 o'clock	报告 Report	0.496307	新增 New case	病亡 Died of illness	0.339126
累计 Grand total	病例 Case	0.494103	补贴 Subsidy	临时 Temporary	0.338531
24 时 24 o'clock	市州 City state	0.491822	人群 Crowd	重点 Focus	0.338365
4 月 April	新增 New case	0.490935	新冠肺炎 Coronavirus disease	确诊 Confirmed case	0.338039
病毒 Virus	指挥部 Headquarter	0.489991	确诊 Confirmed case	输入 Enter	0.334701
统筹 Overall planning	经济社会发展 Economic growth	0.488829	湖北 Hubei	工作 Work	0.334613

Item1	Item2	Pearson r	Item1	Item2	Pearson r
例 Case	0 例 0 cases	0.488444	病例 Case	输入 Enter	0.33374
就业 Employment	创业 Start a business	0.486395	就业 Employment	补贴 Subsidy	0.333471
病例 Case	例 Case	0.484371	连续 Continuous	44	0.33151
输入 Enter	连续 Continuous	0.480089	0 例 0 cases	输入 Enter	0.330646
救治 Treat	医疗 Medical treatment	0.478125	企业 Enterprise	中小微 Medium, small and micro	0.329336
2020 年 2020 year	累计 Grand total	0.477551	旅游 Tourism	消费 Consumption	0.328948
疾病预防控制中心 Centers for disease control and prevention	湖北省 Hubei province	0.477373	市场 Market	消费 Consumption	0.328908
销售 Sales	农产品 Agricultural products	0.476716	全省 Whole province	0 时 0 o'clock	0.328194
0 时 0 o'clock	新增 New case	0.476489	2020 年 2020 year	病亡 Died of illness	0.327921
病例 Case	新增 New case	0.475887	疫情 Epidemic	影响 Influence	0.326524
发热 Fever	门诊 Outpatient	0.475588	省政府 Provincial government	部署 Deploy	0.32485
报告 Report	病例 Case	0.474401	就业 Employment	鼓励 Encourage	0.324733
通道 Aisle	管控 Control	0.473163	政策 Policy	出台 Introduced	0.324667
4 月 April	0 例 0 cases	0.47213	新增 New case	地区 Area	0.324643
病例 Case	治愈 Cure	0.470415	投资 Invest	项目 Project	0.32455
工程 Project	鄂北 Hubei	0.46916	例 Case	无症状 Asymptomatic	0.324241
病例 Case	0 时 0 o'clock	0.46757	抓 Grasp	项目 Project	0.323763
4 月 April	确诊 Confirmed case	0.466852	解除 Relieve	确诊 Confirmed case	0.32353
体温 Body temperature	检测 Detect	0.466453	8 日 8th	离汉 Leave Wuhan	0.32313
湖北 Hubei	肺炎 Pneumonia	0.464204	亿元 100 million yuan	资金 Funds	0.322485
24 时 24 o'clock	0 例 0 cases	0.463997	2020 年 2020 year	转 Change	0.321354
输入 Enter	地区 Area	0.462076	全省 Whole province	确诊 Confirmed case	0.321267
脱贫 Get rid of poverty	贫困人口 Population in poverty	0.461895	重症 Severe case	救治 Treat	0.320464
新型冠状病毒 New coronavirus	工作 Work	0.461825	新增 New case	治愈 Cure	0.320435
病例 Case	连续 Continuous	0.460786	例 Case	感染者 Infected	0.320336
病毒感染 Viral infection	工作 Work	0.458321	信息 Information	入境 Entry	0.319687
24 时 24 o'clock	地区 Area	0.454419	防控 Prevention and control	指挥部 Headquarter	0.318805
患者 Patient	康复 Recovery	0.453966	制定 Formulate	方案 Plan	0.318787
解除 Relieve	无症状 Asymptomatic	0.45374	消毒 Disinfect	场所 Place	0.318767
4 月 April	病例 Case	0.452859	企业 Enterprise	贷款 Loan	0.317939
确诊 Confirmed case	转 Change	0.451957	治疗 Treatment	康复 Recovery	0.317853
输入 Enter	反弹 Rebound	0.449746	稳岗 Stable post	就业 Employment	0.317653
解除 Relieve	感染者 Infected	0.448798	无症状 Asymptomatic	筛查 Screening	0.317553
确诊 Confirmed case	无症状 Asymptomatic	0.447611	病例 Case	0 例 0 cases	0.315607
项目 Project	围绕 Around	0.446611	有序 Orderly	恢复 Recover	0.314795
确诊 Confirmed case	连续 Continuous	0.445106	供应 Supply	农资 Agricultural materials	0.314324
确诊 Confirmed case	感染者 Infected	0.442557	患者 Patient	临床 Clinical	0.314183
解除 Relieve	隔离 Isolation	0.439334	感染者 Infected	筛查 Screening	0.31412
全省 Whole province	2020 年 2020 year	0.43885	体温 Body temperature	场所 Place	0.312848

Item1	Item2	Pearson r	Item1	Item2	Pearson r
统筹 Overall planning	推进 Advance	0.437355	肺炎 Pneumonia	指挥部 Headquarter	0.311265
新冠 New coronavirus	指挥部 Headquarter	0.431784	武汉市 Wuhan	累计 Grand total	0.310791
4月 April	累计 Grand total	0.431042	人员 Personnel	检测 Detect	0.309647
4月 April	24时 24 o'clock	0.430431	2020年 2020 year	治愈 Cure	0.309105
24时 24 o'clock	境外 Abroad	0.42852	脱贫 Get rid of poverty	扶贫 Poverty alleviation	0.309039
报告 Report	确诊 Confirmed case	0.427549	保供 Guarantee	农资 Agricultural materials	0.308588
鼓励 Encourage	创业 Start a business	0.423753	复工 Resume work	返岗 Back to work	0.308138
项目 Project	产业 Industry	0.422607	临床 Clinical	血液 Blood	0.307533
新增 New case	转 Change	0.42253	机制 Mechanism	建立 Establish	0.307492
0例 0 cases	连续 Continuous	0.421634	新增 New case	隔离 Isolation	0.307395
贷款 Loan	小微 Micro	0.420277	人员 Personnel	聚集 Gather	0.306713
元 Yuan	补贴 Subsidy	0.419482	湖北省 Hubei province	病例 Case	0.306304
肺炎 Pneumonia	防控 Prevention and control	0.419097	新型冠状病毒 New coronavirus	疫情 Epidemic	0.305976
累计 Grand total	病亡 Died of illness	0.418459	发放 Issue	临时 Temporary	0.305522
新冠肺炎 Coronavirus disease	24时 24 o'clock	0.417861	推进 Advance	经济社会发展 Economic growth	0.305382
病例 Case	出院 Discharged	0.416539	返岗 Back to work	农民工 Rural migrant workers	0.30455
累计 Grand total	治愈 Cure	0.413701	地区 Area	鄂北 Hubei	0.30376
全省 Whole province	新增 New case	0.412301	病毒感染 Viral infection	疫情 Epidemic	0.303749
肺炎 Pneumonia	场 Field	0.407266	交通 Transportation	出行 Travel	0.303249
企业 Enterprise	复工 Resume work	0.405599	4月 April	0时 0 o'clock	0.302238
防控 Prevention and control	工作 Work	0.405526	发放 Issue	补贴 Subsidy	0.302124
0例 0 cases	地区 Area	0.405464	防控 Prevention and control	常态化 Normalize	0.301349
企业 Enterprise	复产 Resume production	0.403896	累计 Grand total	确诊 Confirmed case	0.301216
亿元 100 million yuan	贷款 Loan	0.402856	患者 Patient	血浆 Plasma	0.300828
例 Case	病亡 Died of illness	0.402521	医院 Hospital	门诊 Outpatient	0.30081
新增 New case	连续 Continuous	0.400101	湖北 Hubei	疫情 Epidemic	0.300547
24时 24 o'clock	例 Case	0.399391	产业 Industry	围绕 Around	0.300542
例 Case	治愈 Cure	0.397825	新冠肺炎 Coronavirus disease	0时 0 o'clock	0.300423
累计 Grand total	出院 Discharged	0.397598			

Machine learning analysis of government's public risk communication during COVID-19 lockdown in Wuhan, China

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ABSTRACT

COVID-19 pandemic has caused millions of deaths worldwide since 2020, and has led to significant lives and economic loss. It was first identified in Wuhan, China, while China has one of the lowest death rates. Understanding Chinese governments' focuses and strategies can offer insights into early pandemic control in the future. This study aimed to explore the strategies and practices of government risk communication adopted during the COVID-19 lockdown in Wuhan, China; and provide implications for effective health risk communication at the early stage of epidemic response. The 90 government press conference records during the Wuhan lockdown (from 22 January 2020 to 1 May 2020) were divided into three batches and preprocessed. Topic modeling, i.e., the Latent Dirichlet Allocation, was used to computationally extract the topics in each batch. We identified important topics early in the lockdown period such as "medical team's work", "assuring supplies for society", "patients detection and isolation"; in the middle batch such as "patient treatment and hospitalization", "enterprises' resumption of work and production", "epidemic prevention and control"; and later in the lockdown including "policies supporting enterprises", "ensuring employment", as well as "blood donation". We found that the Chinese government demonstrated responses that changed during the lockdown period aiming at allowing the society to resume usual activities at the pre-vaccination stage. Our results implied that the epidemic control relied on not only the effectiveness of public health policies, but also the collaboration and collective actions across different systems in the society.

KEYWORDS

COVID-19; government press conferences; topic modeling; natural language processing; health risk communication