

Postprint: Current Status and Development Recommendations for Think Tank Services for Major Public Health Events

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Abstract

[目的/意义] To systematically review and summarize the current state of think tank services for major public health events both domestically and internationally, providing references for the construction of relevant think tanks.

[方法/过程] This study employs literature survey and web-based research methods to investigate think tank services for major public health events, conducting in-depth analysis of case materials from 35 key think tanks.

[结果/结论] The relevant think tank services are categorized into three fundamental types: decision-maker-oriented, professional domain-oriented, and public-oriented. The study summarizes the commonalities and typical service practices of think tank services, identifies gaps between domestic and international think tank services in terms of themes, content, and formats, and proposes recommendations for the development of new-type think tanks with Chinese characteristics for major public health events from three aspects: service design, operational principles, and institutional safeguards.

Full Text

Preamble

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Current Status and Development Suggestions of Think Tank Services for Major Public Health Emergencies

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Abstract: [Purpose/Significance] This study systematically reviews and summarizes the current status of think tank services for major public health emergencies both domestically and internationally, providing references for the construction of relevant think tanks. [Method/Process] Through literature investigation and web-based research, this study examines think tank services for major public health emergencies, conducting in-depth analysis of 35 key think tank cases. [Result/Conclusion] The relevant think tank services are categorized into three basic types: decision-maker-oriented, professional-domain-oriented, and public-oriented. The study summarizes the commonalities and typical service practices of think tank services, identifies gaps between domestic and international think tank services in terms of themes, content, and forms, and proposes recommendations for the development of new-type Chinese-characteristic think tanks for major public health emergencies from three aspects: service design, activity principles, and mechanism guarantees.

Keywords: major public health emergency; think tank service; think tank construction

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A public health emergency refers to “a sudden occurrence that causes or may cause serious harm to public health, including major infectious disease outbreaks, unexplained diseases in groups, major food and occupational poisoning, and other events that seriously affect public health” [1]. Based on their nature, severity, and scope, public health emergencies are classified into four levels: particularly serious (Level I), serious (Level II), relatively serious (Level III), and general (Level IV) [2]. Particularly serious and serious public health emergencies (hereinafter collectively referred to as major public health emergencies) involve complex evolutionary processes characterized by rapid transmission, high unpredictability, risk superposition, and severe harmfulness. Comrade Xi Jinping has demanded “improving the capacity and level of responding to major public health emergencies” [3], emphasizing the need to “strengthen risk awareness and improve collaborative mechanisms for major public health risk assessment, decision-making, and prevention and control” [4]. The Fifth Plenary Session of the 19th CPC Central Committee clarified the main goals for economic and social development during the 14th Five-Year Plan period, proposing requirements to “continuously improve mechanisms for preventing and resolving major risks and significantly enhance emergency response capabilities for public emergencies” [5].

Due to the high-risk and highly uncertain nature of major public health emergencies, high-level think tank services can improve national governance capabilities

for major public health risks, help maintain the superiority of the socialist system, enhance China's international influence, and strengthen its discourse power in the international community. This paper systematically reviews domestic and international think tank research and service practices for major public health emergencies, comprehensively grasps the current status and characteristics of relevant think tank services, and provides references for establishing think tank platforms and improving service capabilities for major public health emergencies in China, while offering suggestions for building new-type Chinese-characteristic think tanks.

2 Think Tank Research for Major Public Health Emergencies

Research on think tanks for major public health emergencies is relatively limited both domestically and internationally. Therefore, we first review the overall status and development trends of think tank research. Literature investigation reveals that, based on their professional fields and disciplinary scope, research on think tanks related to major public health emergencies generally falls into two categories. The first category involves specialized health think tanks directly related to diseases, healthcare, population health, and public health. The second category involves comprehensive think tanks that address major public health emergencies as specific contexts, typically establishing special topic modules or programs to provide think tank services for such events. This classification aligns with the characteristics of major public health emergencies. On one hand, these emergencies often manifest as severe infectious diseases that pose widespread threats to population health, requiring specialized health think tanks to provide "precise and in-depth" targeted services on core issues. On the other hand, the complexity and systematic nature of major public health emergencies demand cross-disciplinary and cross-departmental collaborative responses, with far-reaching impacts extending to various areas of social governance. Comprehensive think tanks can address these challenges from a "broad and comprehensive" governance perspective by focusing on hot topics.

International research on health think tanks started relatively early and has played an effective role in supporting industry and social development. Two main trends are evident: First, the role of health think tanks has gained government attention, with their functions and roles gradually being recognized. S. Shaw advocated for broader and deeper integration of think tanks into health policy and planning, using four British think tanks as case studies to verify the rationality, objectivity, and independence of healthcare think tank operations [8-9]. The Canadian Public Health Systems and Services Research Think Tank convened public health researchers, practitioners, and policymakers to identify six urgent issues in Ontario's public health system research [10]. Second, health think tanks serve as platforms for producing, integrating, publishing, revealing, and transforming knowledge outputs, playing important roles in professional field development. In scientific research, clinical practice, and new technology

applications, think tanks have integrated recommendations, reached consensus, and conducted advocacy [11-12]. On major public health topics, L. Fernandez-Portillo et al. analyzed expert reports from mainstream international development policy think tanks to discuss global health governance under the UN 2030 Agenda framework [13]. The Global Emergency Medicine Think Tank Clinical Research Working Group advanced the application of evidence-based methods in addressing clinical and public health problems [14]. The U.S. Institute of Medicine (IOM) emphasized the need to strengthen public health systems research and improve emergency preparedness and response capabilities [15]. The Working Group on Civilian Biodefense provided response recommendations for medical and public health professionals in scenarios involving civilian exposure to botulinum biological weapons [16].

In contrast, domestic research on health think tanks in China started later, with discourse power and influence yet to be established. In recent years, with the rise of “think tank fever” and the promotion of the “Healthy China 2030” strategy, health think tanks have begun to attract attention. At the macro level, scholars have theoretically explored the construction value, strategic planning, and development paths for health think tanks within the context of new-type Chinese-characteristic think tank construction [17-18]. For instance, Ma Feicheng et al. proposed that building smart health think tanks under big data environments is essential, advocating for exploration of health think tanks that suit China’s national conditions, promoting results sharing, and emphasizing data security and personal health data privacy protection [19]. At the micro level, scholars have summarized development experiences of domestic and international health think tanks based on case analyses to provide references for think tank development. For example, Chen Ting et al. compared the construction of specialized health think tanks domestically and internationally, identifying problems in China’s think tank institutional construction and proposing corresponding countermeasures [20]. Song Mingjing analyzed the basic situation, research content, main characteristics, and policy impact of the U.S. bipartisan biodefense commission [21]. Yang Zaifeng et al. summarized the successful experiences of Johns Hopkins University’s Bloomberg School of Public Health as an international first-class health think tank [22], while other scholars discussed its pandemic simulation exercises [23] and data integration platforms [24].

In summary, significant differences exist in the development paths and levels of think tank research related to major public health emergencies between China and abroad. International think tank institutions were established before theoretical discussions, gradually building discourse power and influence in professional fields and accumulating advanced service experience. Domestic exploration in this field is still in its infancy, with numerous theoretical achievements but practice still focusing on individual international advanced cases. Existing research has not clearly identified whether excellent practices exist domestically, what successful experiences are available, or what gaps exist compared to international standards. During the construction of new-type Chinese-characteristic think tanks, more systematic review studies and case studies in specific contexts

are urgently needed to effectively revitalize existing think tank resources and promote the transformation of theories to guide think tank construction practice. Service innovation is an important orientation in think tank research both domestically and internationally [25]. This study approaches from the perspective of think tank services, aiming to sort out the current status of think tank construction in the specific context of major public health emergencies, clarify the existing service foundations of relevant think tanks at home and abroad, summarize advanced experiences, and provide references for building high-level Chinese-characteristic think tanks with diversified services and growth potential.

3 Current Status of Think Tank Services for Major Public Health Emergencies

3.1 Research Methods

This study is based on evaluation lists from the University of Pennsylvania's Global Go To Think Tank Index and think tanks included in the Chinese Think Tank Index of Nanjing University. Referencing literature and research findings, the sample selection comprehensively considered both specialized health think tanks and comprehensive think tanks. First, through background investigation and preliminary website research, 65 think tanks related to major public health emergencies were selected for web-based investigation. Their strategic visions, historical evolution, expert teams, and typical outputs were collected to assess their service scale and quality. Considering sample data acquisition difficulty, some think tank cases with lower research value were excluded, ultimately determining 35 think tanks as research samples. Partial list of think tanks is shown in Table 1 .

Second, we systematically collected information released by the 35 think tanks on major public health emergencies, including news (official releases and updates), textual products (research reports, survey reports, briefings, commentaries, guidelines), tools (databases, dashboards, toolkits, apps), activities (forums, seminars, workshops, conferences), projects (research projects, training programs, exchange programs), and other materials (videos, audio, comics, etc.). Media reports focusing on think tanks and research papers using think tanks as subjects were also supplemented. For each sample, a database centered on service content was established.

Third, in-depth analysis of case materials was conducted. Materials were broken down, coded, and reorganized according to service content. Professional opinions from medical disease control, public health, social governance, and other fields were consulted through multiple rounds to assess their value. During this process, a cyclical strategy of data collection and analysis was adopted to iteratively refine the analysis results.

Fourth, based on expert opinions, the current status of think tank services for

major public health emergencies was reviewed and summarized. According to the data analysis results, commonalities in think tank services were extracted, and the basic service types and typical practices of existing think tanks were summarized.

3.2 Basic Services and Typical Practices

Based on think tank service targets and social functions, this study classifies think tank services for major public health emergencies into three major categories: decision-maker-oriented, professional-domain-oriented, and public-oriented. Due to numerous commonalities in the forms, purposes, and content topics of basic think tank services, we here select typical practices from each category for review.

3.2.1 Decision-Maker-Oriented Providing theoretical support and intellectual assistance for government decision-making in response to major public health emergencies is the most common and fundamental type of service. Based on think tank research fields and their degree of participation and investment in major public health emergencies, this can be divided into three categories:

- (1) Focusing on specific topics that intersect with or are included in major public health emergencies. The Johns Hopkins Center for Health Security is the world's first specialized think tank dedicated to preventing and responding to major epidemics and public health crises. In 2019, it collaborated with the Economist Intelligence Unit and the Nuclear Threat Initiative to conduct a comprehensive evaluation and comparison of health security and related capabilities across 195 States Parties to the International Health Regulations (2005), publishing the Global Health Security Index (GHS) report [26]. The U.S. Bipartisan Commission on Biodefense is a specialized think tank in biosecurity. In 2015, it released the representative outcome "A National Blueprint for Biodefense" [27], a highly forward-looking and strategic report that has been integrated into the U.S. National Biodefense Strategy and implemented at federal and local government levels. The Shanghai Pasteur Institute of the Chinese Academy of Sciences upholds the Pasteurian values, focusing on key scientific issues such as pathogenic mechanisms of major infectious diseases, providing scientific and technological support and solutions for national public health and biosecurity [28].
- (2) Think tanks themselves engage in research on public health governance systems or emergency management, integrating major health event or crisis response into their services. Founded in 1899, the London School of Hygiene & Tropical Medicine is dedicated to public health and global health research, assisting governments in effectively responding to emergencies such as SARS, swine flu, and zoonotic diseases. Particularly during the Ebola and Zika outbreaks, the think tank received high recognition from the UK Public Health Department for its high-quality intellectual support

services and was invited to co-operate the UK Public Health Rapid Support Team (UK-PHRST) to assist countries in responding to and controlling public health threats caused by disease outbreaks [29]. The Tsinghua University Emergency Management Research Base, established in 2004, pioneered crisis management research from multidisciplinary perspectives including social sciences. It has undertaken important tasks in multiple legislative processes including the Emergency Response Law (Draft), the National Overall Emergency Plan for Public Emergencies, and the Law on Prevention and Treatment of Infectious Diseases, and has participated in drafting policies and documents for the CPC Central Committee, the State Council, and various ministries [30]. Represented by this base, emergency think tanks have accumulated theoretical research and systematic perspectives on “black swan” events through long-term research mechanisms, fully grasping China’s “one plan, three systems” emergency management framework. Following the COVID-19 outbreak, they quickly identified directional, systematic, and fundamental issues in China’s emergency management. The Health Risk Early Warning and Governance Collaborative Innovation Center, led by Fudan University, pioneered social risk prediction in the health field in China in 2012, focusing on disease prevention and management, infectious disease control, and other areas closely related to major public health emergencies, providing forward-looking governance recommendations for the government [31].

- (3) Think tanks engaged in comprehensive research, health policy research, and other fields not directly related to major public health emergencies have leveraged their advantages to establish special programs and provide services during the COVID-19 pandemic. The Brookings Institution, one of the oldest and most influential top think tanks in the U.S., leads internationally in public policy research. Facing uncertainties brought by the pandemic to the global economy and public health burden, it provided macroeconomic policy recommendations and identified deficiencies and healthcare inequities in the U.S. health system [32-33]. The RAND Corporation, a renowned U.S. think tank, discusses public health preparedness, emergency services, and response as special topics. Facing issues such as large-scale infections, economic disruption, and enhanced social risks and uncertainties triggered by the pandemic, it actively built evidence and information repositories based on evidence-based principles to provide reference recommendations for policy responses and adjustments [34]. The U.S. Congressional Research Service has long been committed to assisting Congress and its members during the legislative process. During the COVID-19 pandemic, it provided extensive customized services, with publicly available research reports covering eight major research directions: COVID-19 overview, key international issues, U.S. public health status, impacts on personal finance, impacts on U.S. business and economy, responses from administrative departments at all levels, congressional responses, and legislative and legal analysis [35]. China’s State Council De-

velopment Research Center focuses on comprehensive policy research and consultation regarding national economic, social development, and reform and opening-up. It treated pandemic research as a major topic, studying the impact of COVID-19 on economic operations and the modernization of China's governance system and capacity, proposing recommendations for improving China's public health emergency management system [36]. The Wuhan University Population and Health Research Center and the Huazhong University of Science and Technology National Governance Research Institute established special research programs on COVID-19 response, submitting results in internal reference forms. Many recommendations received affirmative instructions from national and provincial leaders and were transformed into anti-epidemic policies [37-38]. Numerous science and technology think tanks represented by the Chinese Academy of Sciences, Chinese Academy of Engineering, and Chinese Academy of Science and Technology for Development provided suggestions on epidemic trends, prevention and control strategies, disease diagnosis and treatment, scientific and technological breakthroughs, work resumption, and emergency management, which received high attention and resolute implementation from central leaders, providing scientific intellectual support for winning the epidemic prevention and control battle [39].

3.2.2 Professional-Domain-Oriented Professional domain personnel refer to key stakeholders who need to undertake professional tasks and fulfill social responsibilities during major public health emergencies. Think tanks providing professional services to these personnel can directly deliver think tank outcomes to academia and industry, helping improve recognition of think tanks in these fields and building a community of professionals for major public health emergencies, thereby ensuring long-term sustainable development of think tanks from a mechanism perspective. This study divides professional domain personnel into research and clinical personnel and related practitioners (enterprise and media personnel).

- (1) For research and clinical personnel. First, providing scientific and technological support services, releasing frontier developments, and building emergency information resources and knowledge repositories. The UK's National Institute for Health and Care Excellence (NICE) effectively applies health technology assessment results to health decision-making processes, providing evidence-based guidance, quality standards, performance indicators, and information services for health, public health, and social care practitioners. It has developed three types of products totaling 38 items for COVID-19 [40]. China's National Science and Technology Library provides specialized information services for major scientific and technological projects such as "Major New Drug Development" and "Prevention and Treatment of Major Infectious Diseases such as AIDS and Viral Hepatitis," as well as for emergency scientific research on COVID-19. The Institute of Medical Information/Library of the Chinese Academy of

Medical Sciences developed the COVID-19 Prevention and Control Knowledge Service Platform [41]. The Ministry of Science and Technology, National Health Commission, China Association for Science and Technology, and Chinese Medical Association jointly built the “COVID-19 Scientific Research Achievement Academic Exchange Platform,” collecting scientific research achievements, research papers, experimental data, clinical cases, and important progress from emergency research projects to enable release, sharing, and exchange of the latest information. Additionally, numerous think tanks release frontier developments in research breakthroughs, academic conferences, and lectures, with some publishing academic reports and monographs and hosting journals, providing intellectual services that fully demonstrate their academic value.

Second, providing professional and specialized capacity training services. International first-class schools of public health such as Johns Hopkins Bloomberg School of Public Health, Yale School of Public Health, and Harvard T.H. Chan School of Public Health have cultivated numerous professionals in health policy, epidemiology, and other fields through years of dedicated work, promoting the establishment and improvement of global health systems and enhancing humanity’s capacity to respond to global health threats and risks. The Johns Hopkins Office of Critical Event Preparedness and Response provides specialized training services aimed at improving practitioners’ emergency response capabilities, with training forms including seminars, online training, and workshops covering topics such as bioterrorism, risk communication, post-disaster psychological emergency assistance measures, and post-disaster self-psychological counseling. The Peking University Public Health and Major Epidemic Prevention and Control Strategic Research Center develops customized training plans and characteristic courses for different target personnel, covering professional degree education (e.g., MPH, DrPH), continuing education for professionals (e.g., CFETP, CMFETP), and training for other personnel.

- (2) For related practitioners (enterprise and media personnel). First, building exchange platforms, providing channels for intelligence and knowledge dissemination, and creating venues for public diplomacy and international dialogue. Think tanks for major public health emergencies build professional interaction platforms among think tanks, between think tanks and industry personnel, and between think tanks and media through forums, conferences, seminars, and other forms. Under the EU Framework Programme for Research and Innovation, the Japan Health Policy Institute held a series of webinars on innovative research topics such as coronavirus diagnosis, treatment, and drug and vaccine development, exploring cooperation opportunities between the EU and Japan. The Kaiser Permanente Institute for Health Policy held forums discussing threats and prospects for telemedicine development in the pandemic context, providing frontier experiences and insights for telemedicine and nursing service practitioners and public and private sectors. The Health Risk Early Warning and Governance Collaborative Innovation Center held international sem-

inars on the theme of “Strengthening Emergency Capacity Building” as part of “Healthy China: Health Emergency Management Strategies,” and co-hosted international seminars on health emergency preparedness with the International Association of Emergency Managers (IAEM) and other units.

Second, disseminating ideas and providing viewpoints and materials for media. During the COVID-19 prevention and control process, think tank intellectual achievements were reprinted, reported, and commented on by mainstream domestic and international media. Multiple think tank experts participated in policy formulation and interpretation for epidemic prevention and control, actively explaining situations and responding to media questions at press conferences. Brookings Institution’s research outcomes such as “Seven Scenarios for COVID-19’s Impact on the Global Economy,” “Global Development Cooperation Under COVID-19,” and “Global Governance After the Pandemic” were widely reprinted by media. The Tsinghua University Institute for Contemporary China Studies collaborated with China Daily and Peking Union Medical College to compile the report “China’s Practice in Fighting COVID-19,” published on China Daily’s “China’s COVID-19 Response” thematic website. In August 2021, the Chongyang Institute for Financial Studies at Renmin University of China, together with Taihe Institute and Grandview Institution, held a report release and seminar on “‘America First’?! The Truth About America’s COVID-19 Response” [42], attracting coverage and extensive discussion from dozens of renowned domestic and international media outlets including CCTV, Xinhua News Agency, and Bloomberg, generating global repercussions.

3.2.3 Public-Oriented The public is the broadest service target and interactive group for think tanks on major public health emergencies. Think tanks serving the public is an effective way to disseminate policy positions, increase social visibility, and enhance discourse power construction, helping think tanks amplify their voices, guide public opinion, build consensus, and enlighten public wisdom. Public-oriented think tank services focus on two aspects:

- (1) Providing information integration, revelation, and dissemination services. Think tanks for major public health emergencies directly provide information release services, publicizing national policies and releasing major epidemic prevention and control updates. They also conduct secondary integration, revelation, and release of information resources. Based on information resource integration, the Johns Hopkins Office of Critical Event Preparedness and Response summarizes authoritative information release channels during emergencies, compiling links to information such as FEMA disaster alerts, CDC emerging disease reports, and HHS public health emergency reports into lists to solve the “where to find” problem the public faces in accessing information on major public health emergencies. From the perspective of information revelation and release, many think tanks release national policy interpretations in graphic and video formats.

Some think tanks combine geographic distribution and transmission of major public health emergencies, epidemiological characteristics with visualization technology to enhance the interest and interactivity of information revelation and release. Among them, the COVID-19 dashboard developed by Johns Hopkins University [43], with its timely high-quality data sources and user-friendly navigation and interactive design, has become the most authoritative and influential data visualization product during the pandemic. The London School of Hygiene & Tropical Medicine developed a vaccine tracker showing the global COVID-19 vaccine development pipeline in timeline format. The Institute of Medical Information/Library of the Chinese Academy of Medical Sciences provides a dashboard showing national COVID-19 cumulative and existing confirmed case distribution heatmaps and a tool for querying travel histories of confirmed patients in its COVID-19 Prevention and Control Knowledge Service Platform [40].

- (2) Providing medical and emergency knowledge popularization. Think tanks for major public health emergencies carry out science popularization services in diverse forms to disseminate scientific knowledge. The U.S. Bipartisan Commission on Biodefense collaborated with writers to produce graphic comics and audiobooks of the novel “Germ Warfare,” providing open access services to society. The U.S. National Institutes of Health developed a daily health toolkit and released monthly health newsletters summarizing self-protection methods during the pandemic from aspects such as self-management, symptoms, treatment pathways, and vaccine knowledge. The Bloomberg School of Public Health assisted Native American tribes in responding to the pandemic by investigating information needs of tribal leaders, indigenous community members, and healthcare workers, developing an online library providing resources such as science popularization guidance, public service announcements, videos, and social media toolkits. It also convened a team of Native American experts in child development, public health, and communication, along with Native American illustrators, to produce a series of children’s books [44]. The Institute of Medical Information/Library of the Chinese Academy of Medical Sciences provides science popularization knowledge in three sections—protection knowledge, popular science videos, and professional terminology—in its COVID-19 Prevention and Control Knowledge Service Platform [40].

3.3 Summary of Domestic and International Think Tank Service Characteristics and Gap Analysis

In summary, in the context of major public health emergencies, think tanks provide rich services for decision-makers, professional domain personnel, and the public. However, it is not difficult to identify certain gaps between domestic and international first-class think tanks in terms of service capacity and service levels. The main gaps can be summarized into three key points:

- (1) Forward-looking awareness and specialized capacity in think tank service

themes. The thematic characteristics of think tank services are closely related to think tanks' positioning, mission, and vision. Internationally renowned mainstream think tanks lead in both horizontal expansion and vertical deepening of research fields, with more numerous and larger-scale think tanks featuring focused topics and specialized services. These different think tanks have distinct characteristics, can fully leverage their advantages, possess the awareness and ability to transform research results into service practices, and have produced representative outcomes, forming brand influence. Represented by the Johns Hopkins Center for Health Security and the U.S. Bipartisan Commission on Biodefense, these think tanks enjoy extremely high industry visibility and recognition. Before the COVID-19 outbreak, the vast majority of domestic think tanks did not provide services related to major public health emergencies, with only a 极少数少数 engaging in broad fields such as biosecurity, emergency management, and social risk research, often focusing solely on scientific topics while lacking strategic awareness for policy translation. The pandemic has posed new requirements for upgrading think tank services in China, stimulating relevant think tanks' service and development awareness and prompting them to leverage their advantages to provide higher-level services. For example, comprehensive think tanks represented by the Chongyang Institute for Financial Studies at Renmin University of China have also begun actively participating in global discussions. In response to the pandemic context, think tanks focusing on major public health emergencies have gradually emerged, with new-type think tanks represented by the Peking University Public Health and Major Epidemic Prevention and Control Strategic Research Center being established, though they are still in the early stages of construction.

- (2) Long-term construction accumulation in think tank service content. Think tank service content is based on think tank information resource construction. International think tanks started earlier and have decades or even centuries of development history, having withstood tests of major public health emergencies throughout history. Compared with domestic think tanks, they possess more substantial data resource accumulation and practical service experience for major public health emergencies. Taking RAND Corporation as an example, the think tank has undergone service practice tests during major events such as SARS, Ebola, and COVID-19, accumulating rich experience in grasping urgent issues in public health emergency response, formulating research frameworks, innovating methods and theories, and producing professional outcomes. This has laid an information resource foundation for its subsequent evidence-based decision-making services, ensuring richer service content. Most domestic think tanks lack decision-making service awareness and long-term construction experience in major public health emergencies. Although some information institutions have leveraged their advantages in organizing, analyzing, and processing data and information to build think tank-style information

service platforms using the pandemic response as an opportunity, seeking to transform resource construction into resource service (“accumulate richly and release sparingly”), represented by the National Science and Technology Library, achieving “breakthrough” at social, academic, and government levels [45], these platforms still have very limited influence at the decision-making level.

- (3) Innovative exploration in think tank service forms. Innovation in think tank service forms is an effective way for think tanks to expand their influence. The Johns Hopkins Bloomberg School of Public Health provides good practical references in this regard. The think tank has long emphasized the accumulation, revelation, mining, and comprehensive utilization of data resources, and on this basis, fully leverages innovative awareness to produce think tank products with diverse forms and rich application scenarios. It has also explored various service forms in public science popularization work, emphasizing interest and audience preferences in service design. Major health events require joint social governance with public participation, yet domestic think tanks rarely consider public acceptance of professional knowledge and lack innovative utilization of emerging technologies and media in the digital age, leaving considerable room for improvement in think tank service forms.

4 Development of Think Tanks for Major Public Health Emergencies

COVID-19 has been a major test for think tank service capabilities for major public health emergencies both domestically and internationally. Relevant think tanks should summarize experiences and lessons from this pandemic response, reference excellent service cases at home and abroad, and plan their specific service paths for major public health emergencies. Based on the review of relevant literature and the above analysis of think tank service status, we propose the following recommendations for developing new-type Chinese-characteristic think tanks for major public health emergencies:

4.1 User-Layered Service Design Based on Characteristics of Major Public Health Emergencies

The particularity of major public health emergencies determines that corresponding think tanks must conduct scientific design and rational planning, establishing a user-oriented think tank construction concept. From the perspective of think tank self-construction, decision-making consultation capabilities for major public health emergencies are inseparable from scientific research capabilities, clinical practice, and joint prevention and control systems. Think tank services should establish a “peacetime-wartime integration” service awareness, playing continuous roles throughout all stages of major public health emergencies—before, during, and after events—and establishing long-term mechanisms for

think tank development. From the perspective of think tank user needs, the multi-stakeholder collaborative governance of major public health emergencies determines diversified think tank user subjects, whose decision-making objectives and capabilities determine their different expectations for think tank services. Based on literature and think tank research results, we propose the following recommendations for services to decision-makers, professional personnel, and the public:

4.1.1 For Decision-Makers In the pre-event or “peacetime” state, based on international advanced practices and combined with China’s national conditions and realities, think tanks should provide institutional recommendations for national emergency management system construction (including normalized emergency systems and resource allocation plans), formulate medium- and long-term plans and strategic goals, and review and assess construction progress and effectiveness during implementation. They should strengthen forward-looking governance awareness, attach importance to risk cognition and assessment, scientific judgment, and early warning of major public health emergencies, and evaluate national capabilities to respond to such risks and identify loopholes, enabling decision-makers to clearly grasp the status of emergency management and public health governance systems. During the event or “wartime” response phase, think tanks should serve government emergency decision-making, transforming emergency plans into overall disposal solutions that fit actual conditions at the macro level. They should dynamically supervise work in all aspects of the tiered response system, especially assessing rescue work, identifying potential risks, and proposing optimization recommendations. As a “mouthpiece” for the government, they should release policy interpretations and evidence-based situation assessment reports. In the post-event recovery phase, think tanks should conduct disaster assessments of major public health emergencies, provide reconstruction recommendations for decision-makers and identify key points, promote rapid recovery of national social and economic operations to normal, conduct retrospective studies of events, review performance of institutions at all levels, identify strengths and weaknesses in crisis response, and form emergency case databases and pandemic knowledge repositories.

4.1.2 For Professional Domains Think tanks should fully leverage their disciplinary intellectual resource advantages to provide training, education, and knowledge services for professional personnel, promoting diversification and specialization of talent teams. Under normal conditions, think tanks should provide professional knowledge, comprehensive capabilities, and career development education for professional personnel, and provide diagnosis, treatment, and research progress through seminars, newsletters, briefings, clinical data, and case databases. During emergency states, major public health emergencies such as emerging infectious diseases may be in unknown domains of human knowledge. Think tanks should build pandemic knowledge repositories, lead the formulation of diagnosis and treatment consensus and guidelines, develop medical rescue and

training programs, and continuously update them as clinical evidence accumulates. They should undertake emergency scientific research tasks and provide science and technology think tank services. In addition to professional personnel executing scientific research and clinical rescue tasks, the major public health emergency response chain also includes industry-related practitioners such as rescue equipment and supplies, vaccine and drug development, and downstream industries. Think tanks should provide intelligence and consulting services to assist enterprises in adjusting their own prevention and management while adjusting business and production layouts, helping them fulfill social responsibilities and jointly address the enormous challenges that major public health emergencies pose to the economy and society.

4.1.3 For the Public Think tanks should fully leverage their discourse power advantages to output emergency science popularization knowledge on major public health emergencies to the public during normal times, building professional discourse power and credibility. During “wartime,” as authoritative channels and bridges for information release, they should communicate among government, media, and public. On one hand, they should speak with scientific facts, advocate rational thinking, guide mainstream social public opinion, build social consensus, promptly refute misinformation, and avoid “infodemics.” On the other hand, they should interpret and publicize national policies, respond to the public’s most urgent needs, feed public needs back to decision-makers to promote democratic decision-making, reflect public voices to promote social stability.

4.2 Scientific Principles of Think Tank Services

Think tanks for major public health emergencies must “support scientific decision-making with scientific consultation, and lead scientific development with scientific decision-making” [7]. To ensure the scientific nature of think tank research, strict control of their own scientific quality is required, using the scientific nature of think tank research to guarantee decision-making scientific nature. Combining the excellent practices in typical think tank services described above and using the DIIS three-dimensional theoretical model (Data-Information-Intelligence-Solution, collecting data - revealing information - comprehensive judgment - forming solutions) [46] as a reference framework, we believe that to ensure the scientific nature of think tank research, their activity processes must follow the following principles:

4.2.1 Evidence-Based Decision-Making as the Research Paradigm and Practice Core The complexity and unpredictability of major public health emergencies enhance the necessity of adhering to evidence-based decision-making principles, requiring timely collection and organization of the latest evidence as a basis for decision-making. The evidence-based decision-making principle helps “force” high-quality (comprehensive, reliable, authentic, standardized) data management processes, building a solid data foundation for

think tank research and fully leveraging the promotional role of think tanks in transforming evidence and data into decisions.

4.2.2 Data Collection and Information Revelation Need Both Objectivity and Timeliness Major public health emergencies are highly uncertain, and the quality of data and evidence directly determines decision-making quality. Timely access to objective data reflecting real situations is extremely important. Think tanks must be adept at timely collecting objective data and revealing it through visualization to ensure the credibility and wide dissemination of viewpoints.

4.2.3 Specialization and Independence as the Basic Requirements for Scientific Comprehensive Judgment The high difficulty of judging major public health emergencies places higher demands on the specialization level of expert teams, especially when facing emerging infectious diseases and other fields not yet fully understood by humans. The current situation of incomplete information, dynamic epidemic changes, and difficult quality control makes the effectiveness of expert predictions uncertain, while the implementation effects of decisions at this time are often “one-time” with potentially irreversible consequences, making experts’ tacit knowledge and experience reserves particularly important. Therefore, think tanks need to recruit top experts from different fields during “peacetime,” including at least high-level experts in public health, clinical medicine, critical care medicine, psychological intervention, emergency management, emergency rescue, logistics and supply chains, big data, and artificial intelligence technology, avoiding professional homogeneity and training during peacetime to exert strength during wartime. Independence means allowing experts to work independently, being responsible only for their areas of expertise, allowing different voices to exist without mutual influence or avoiding debate, while experts must not be influenced by other factors and should only provide recommendations based on decision-making needs.

4.2.4 Robustness and Agility as Practical Requirements for Solutions The complexity of major public health emergencies determines that decision-making always lags behind actual development. In this context, think tank solutions should have certain robustness to improve the capacity to accommodate uncertain factors. After decision-making solutions are implemented, dynamic supervision and rapid assessment are required. Agility can ensure timely adjustments based on actual conditions, enhance dynamic response capabilities, promote continuous optimization of decision-making content, and ensure scientific and effective decision-making.

4.3 Mechanism Guarantees for Think Tank Services

Perfect think tank operation mechanisms are the basic guarantee for think tanks to provide quality services. First, decision-makers should value and standardize

the roles and functions of think tanks, providing reasonable, legal, and compliant institutional guarantees for think tanks. All participating parties in think tanks need smooth intervention channels, capacity to support decision-making, and accountability to actual decision-making needs. Currently, when responding to major public health emergencies, think tanks often provide suggestions through expert groups. Therefore, decision-makers should improve expert consultation systems and expert evaluation standards, strengthen expert database construction that emphasizes both professional capacity and strategic thinking during “peacetime,” and obtain rapid response and intellectual support during “wartime.” Second, the complexity of decision-making during major public health emergencies increases the complexity of information needs. As service providers, think tanks have high requirements for information acquisition and update efficiency, information quantity and quality, and fine-grained information. Therefore, decision-makers should lead the formulation of reasonable data and information disclosure and sharing systems to provide guarantees for specialized think tank services. Finally, funding guarantee systems for think tanks need to be established to avoid low-level redundant construction, plan appropriate and reasonably structured financial investment, and ensure healthy and sustainable think tank development.

After creating external mechanisms that provide objective guarantee conditions for think tank operation, think tanks also need to establish internal operation mechanisms suitable for their own development and guarantee them institutionally to ensure the quality stability and authority of decision-making consultation reports. Think tanks should attach importance to their own emergency decision-making service capacity building, formulate activity systems and processes for emergency consultation services for major public health emergencies, and maintain close communication with decision-makers while also valuing indirect intervention in social governance through the public, media, and academia.

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Current Status and Development Suggestions of Think Tank Services for Major Public Health Emergencies

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Abstract: [Purpose/Significance] This paper aims to provide reference for

the construction of relevant think tanks by summarizing and analyzing the current status of think tank services for major public health emergencies at home and abroad. [Method/Process] Through literature research and web-based investigation, this study examines think tank services for major public health emergencies, including in-depth analysis of 35 key think tank cases. [Result/Conclusion] The relevant think tank services are classified into three basic types: decision-maker-oriented, professional-domain-oriented, and public-oriented. The research summarizes the commonalities and typical service practices of think tank services, identifies gaps between domestic and international think tank services in terms of themes, content, and forms, and proposes recommendations for developing new-type Chinese-characteristic think tanks for major public health emergencies from three aspects: service design, activity principles, and mechanism guarantees.

Keywords: major public health emergency; think tank service; think tank construction

Note: Figure translations are in progress. See original paper for figures.

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