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Suggestions on Strengthening Construction of Animal Disease Prevention and Control System in China

Abstract

Since the veterinary system reform in 2005, the animal disease prevention and control system in China has made great progress, which has played an important role in stabilizing the supply of animals and animal products, ensuring animal health and human health. The modern animal disease prevention and control system consistent with the Healthy China strategy is an indispensable part of building a strong national public health system. Based on current situation and main problems, this paper presents the basic ideas of building a modern animal disease prevention and control system, suggests to coordinate the existing resources to strengthen the core mission of animal disease prevention and control system, including animal disease surveillance, emergency management, quarantine supervision, technical guidance, information technology application, scientific and technological support. To provide strong support for healthy development of animal husbandry, public health safety, and biosafety, we also need to build an animal disease prevention and control support system matching with perfect organization, personnel, infrastructure, and capacity.

Keywords

animal diseases; prevention and control; system construction

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Suggestions on Strengthening Construction of Animal Disease Prevention and Control System in China

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Abstract: Since the veterinary system reform in 2005, the animal disease prevention and control system in China has made great progress, which has played an important role in stabilizing the supply of animals and animal products as well as ensuring animal health and human health. The modern animal disease prevention and control system consistent with the Healthy China strategy is an indispensable part of building a strong national public health system. Targeting the current situation and main problems, this paper presents the basic ideas of building a modern animal disease prevention and control system, suggests coordinating the existing resources for the core functions of animal disease prevention and control system, including animal disease surveillance, emergency management, quarantine supervision, technical guidance, information technology application, and scientific and technological support. To provide strong support for healthy development of animal husbandry, public health safety, and biosafety, an animal disease prevention and control support system matching with perfect organization, personnel, infrastructure, and capacity needs to be built. **DOI:** 10.16418/j.issn.1000-3045.20200915003-en

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In 2020, COVID-19 raged around the world, the prevention and control of which challenged China's governance system and capacity. The Communist Party of China (CPC) and the State Council attached great importance to the prevention and control of this epidemic and regulated that swift actions must be taken to address problems, plug loopholes, and reinforce weak links. The mechanism for preventing and controlling epidemics and the national public health emergency response system must be improved for the response to such emergencies^[1]. Since human beings and animals share the same ecosystem, the animal disease prevention and control system is an important part of the national public health system, and it has played a key role in the prevention and control of health emergencies such as H7N9 influenza. Therefore, this system guarantees the supply of animals and animal products as well as animal health and human health. However, the African swine fever attacking China in 2018 exposed several shortcomings of the current system, which mainly included the insufficient performance of core responsibilities and the imperfect support system. To implement the Healthy China strategy and ensure animal health and human health, we should accelerate the construction of a modern animal disease prevention and control system adapting to the new era and new demands, and give full play to the role of the system in source prevention and control of zoonosis, safety of animal products, environment protection, and biosecurity system construction.

1 Status and problems of the animal disease prevention and control system in China

The current animal disease prevention and control system in China has been established since the veterinary management system reform in 2005, which is composed of national, provincial, municipal, and county-level institutions and mainly responsible for the prevention, control, and treatment of animal diseases. The provincial, municipal, and county-level animal health supervision institutions are mainly responsible for quarantine of animals and animal products as well as other supervision and management works. The animal husbandry and veterinary stations at the township and village levels and the corresponding staff provide technical support. In addition, 14 national veterinary reference laboratories, 10 professional laboratories, and three regional laboratories have been established for the final diagnosis of specific animal diseases, preparation of standards, recommendation of vaccine strains, development of relevant technologies, policy consultation, performance evaluation, technical guidance, and international exchange and cooperation. These institutions and departments collaborate with each other, jointly constituting the current animal disease prevention and control system in China.

Given the complex and changeable situations of animal diseases in China, their prevention and control remain challenging. The frequent cross-regional and long-distance

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circulation of live livestock and poultry may accelerate the spread of pathogens; the increase in zoonoses surge the pressure on public health; emerging animal epidemics and the epidemics caused by variants, such as highly pathogenic avian influenza, highly pathogenic porcine reproductive and respiratory syndrome, peste des petits ruminants, and African swine fever, keep attacking the animal husbandry. In general, the current animal disease prevention and control system in China cannot meet the increasing requirements in the new era.

(1) The personnel of the animal disease prevention and control system have been decreasing. In recent years, the number of veterinarians at institutions of all levels has decreased, resulting in an imbalance between human resources and institution responsibilities. Compare with 2008, the 14% decrease of animal disease prevention and control institutions in 2018 was accompanied with a 29% decrease of veterinarians. The personnel at animal health supervision institutions decreased by 11%, in which the quarantine personnel decreased by 21%. The full-time veterinarians generally have low educational level and are ageing. Up to 2018, more than 110 000 people passed the practicing veterinarian qualification examination and obtained the qualification certificate, while only 39% registered as practicing veterinarians. Only 6% of the registered practicing veterinarians worked in animal farms. Most of qualified professional veterinarians failed to participate in the disease prevention and control of livestock and poultry industry.

(2) The core responsibilities of the animal disease prevention and control system have not been fully performed. The performance of major tasks (e.g., diagnosis and testing, monitoring and warning, emergency response, combination of epidemic prevention and quarantine, scientific and technological support) of the current animal disease prevention and control system cannot meet the requirements for building a modern one, which is manifested by the following problems. The last kilometer problem of access to veterinary clinical information from national animal disease reporting system remains to be addressed. The animal disease emergency response system is not professional enough, lacking permanent institutions and professional teams. Other problems include the imperfect official veterinary system, insufficient technological support for quarantine, and unsmooth information sharing. The roles of origin quarantine and slaughter quarantine have not been fully played in supervising and promoting the implementation of disease prevention and control responsibilities as well as the cutting off of disease transmission routes by breeding entities.

(3) The animal epidemic prevention support system is not sound. Due to the insufficient financial investment and decreased investment in the construction of infrastructure, the funds required for animal epidemic prevention cannot be ensured. Some animal epidemic monitoring stations, diagnosis laboratories, animal epidemic prevention checkpoints on highways, and township veterinary stations constructed and supported by the state cannot work efficiently due to the

lack of operating funds as well as the idle and deteriorated instruments.

2 Establishment of core ideology of modern animal disease prevention and control

Animal disease prevention and control is the premise of safety in animal production, animal products, public health, and environment. With the goals of sustainable development of animal husbandry, construction of Healthy China, and building of a strong public health system, the core ideology of the whole-chain animal disease prevention and control should be established based on the construction of a biosafety system from the perspectives of infection source, transmission route, and susceptible animals. This will improve the ability of containing diseases in animal populations and gradually transfer effective control to prevention and elimination of animal diseases.

(1) To control the infection sources. The infection sources must be controlled and eliminated through clinical inspections, diagnosis and testing, monitoring and warning, flow traceability, and emergency treatment.

(2) To cut off the transmission routes. The circulation of animals and animal products should be strictly regulated by a modern live animal logistics and management system to contain the disease transmission caused by irregular animal circulation. A cold chain logistics network connecting production and sales needs to be constructed to realize centralized slaughter, brand management, cold-chain circulation, and marketing of cold fresh products.

(3) To protect susceptible animals. The nutrition and environment should be improved to ensure animal population health, and vaccination can be employed to enhance herd immunity. Besides, it is essential to take biosafety and eradication measures to avoid the contact of susceptible animals to pathogens. The farm households and production units should identify key risk points and implement biosafety measures. The breeding companies should establish an internal biosafety system for standardized running and supervision. The regional management departments should coordinate the layout by a variety of administrative and technical methods. For the whole industry, the biosafety measures in the whole chain involving animal production, transportation, and slaughter should be integrated. More importantly, the practitioners need to have the awareness of prevention and control throughout the chain and conscientiously comply with the relevant rules.

3 Suggestions on accelerating the construction of a modern animal disease prevention and control system

To accelerate the construction of a modern animal disease

prevention and control system, we should coordinate the existing resources, strengthen the core functions, and build a support system with sound organization, professional and sufficient personnel, adequate infrastructure, and strong capacity. Such a modern system will match with the intensity of animal diseases in China and the impact on social production and life based on the needs of Healthy China and national biosafety strategy.

3.1 To strengthen the core functions of the animal disease prevention and control system

(1) Animal disease surveillance. Animal disease surveillance is the premise for prevention and control of contagious diseases and also the core task of the animal disease prevention and control system to be strengthened. The relevant information should be gathered via multiple ways for the identification of infection sources. ① Establishing a network of veterinary diagnosis laboratories. The China Animal Disease Control Center should take the lead to coordinate the national veterinary reference laboratories for various animal diseases as well as the veterinary laboratories of animal disease prevention and control institutions at all levels to establish a complete national animal disease monitoring network for the integration of scientific research, disease prevention and control, and production services. ② Expanding the scope of disease information to be collected. The frontline of disease prevention should be moved forward, and the data collection of the national animal disease reporting system should be extended to the frontline of veterinary clinics. Besides, the information collection channels of sick and dead animals and the syndrome monitoring module should be increased to improve the sensitivity of the reporting system to the animal diseases of unknown origin. Targeted surveillance and epidemic survey should be carried out to reveal the law of disease occurrence and development and provide a scientific basis for decision-making. ③ Sorting the information reporting process. The disaggregated reporting of major and conventional animal diseases should be optimized, and efforts can be made to explore the direct reporting model. A mature reward and punishment system can improve enthusiasm and initiative of breeding entities and veterinarians in disease reporting. The clear scope of accountability can facilitate the distinguishing of natural disasters from man-made disasters and relieve the pressure of local administrative agencies. ④ Improving the information application efficiency. The existing work mode should be adjusted. Specifically, the epidemiological survey should be connected with animal disease surveillance to form a closed loop of discovery–report–survey–analysis–prevention and treatment, and turn “data” into “action.”

(2) Emergency response. Early, rapid, strict, and fine emergency response guarantees the rapid elimination of infection sources. The emergency management of major animal diseases should combine prevention with emergency

response. In specific, normalized functional institutions should be established for carrying out daily research and emergency response of animal diseases, which should be capable of responses in case of any sudden disease^[2]. Specialized and normalized agencies at all levels should be established with the corresponding functions for emergency responses to major animal diseases to ensure the effective operation of the animal disease emergency management system. ① Improving the emergency response system. The systematic research on the spread law of emerging animal diseases and the summarization of experience and lessons should be carried out. Efforts should be made to form the layer-to-layer reporting system and implement emergency response measures. The graded response plan should be formulated, and the reserve of emergency supplies should be guaranteed. In addition, the global estimation for the epidemic development and the coordination and allocation of labor, financial, and material resources will enable the rapid response and coordinated operation of the emergency management system. ② Guiding the responses to major animal diseases. Technical guidance should be provided for the surveillance, tracing, disinfection, culling, harmless treatment, and risk assessment. Benign interaction should be realized among disease surveillance, laboratory testing, epidemiological survey, emergency response, and measure adjustment. ③ Strengthening the emergency response team management. The emergency response coordination team should be established for the management both at ordinary times and in emergency cases. At ordinary times, the emergency responses should be drilled for the timely warning, assessment, and reporting in case of any epidemic. The emergency response at the corresponding level should be promptly initiated according to the legal procedures to guide the implementation of corresponding response measures.

(3) Quarantine and supervision. Quarantine and supervision facilitate the block of disease transmission route and the implementation of animal disease prevention and control measures. Therefore, the responsibilities of animal health supervision institutions should be fully played from animal feeding, circulation to slaughter. ① Restructuring animal health supervision institutions. Under the conditions of dismantling and merging of animal health supervision institutions, integration of law enforcement functions into comprehensive agricultural law enforcement, and different centralized management units of animal quarantine functions, animal health supervision institutions should be restructured to ensure the quarantine of animals and animal products as well as other supervision and administration works for epidemic prevention. ② Strengthening the official training and assessment of veterinarians. Certificated veterinarians must pass the national training and examination in the aspects of laws and regulations, laboratory diagnosis, epidemiological testing, and emergency disease eradication technology. ③ Integrating disease prevention and quarantine.

The benign interaction should be promoted between disease prevention, quarantine, and supervision in various links including animal breeding, market circulation, slaughter, and processing on the premise of qualified compulsory immunization, daily surveillance, risk classification, and epidemic grading. The disease diagnosis and detection system should be employed to guarantee animal quarantine and animal health supervision and improve the functioning accuracy and authority of certificated veterinarians.

(4) Technical guidance. With the aim of protecting susceptible animals, the animal disease prevention and control institutions should provide technical guidance and demonstration for various disease prevention entities in compulsory immunization, disease eradication, and biosecurity system construction. ① The institutions should promote the planning and operation, give the technical guidance, and evaluate the performance of compulsory immunization to ensure the immunization coverage and quality as well as the implementation of the mandatory immunization plan for major animal diseases. ② The comprehensive prevention and control demonstration projects should be implemented in terms of disease eradication, prevention and control of zoonoses, and biosecurity system construction. A comprehensive set of supporting techniques should be formed through screening, piloting, and demonstration for the implementation of the national animal disease prevention and control plan. ③ A training system should be established for certificated veterinarians, practicing veterinarians, veterinary service system, and rural veterinarians with existing training resources. The training should be systematically carried out to improve the professional level of veterinary services.

(5) Application of information technology. “Internet+” has been included in the national strategy. Mobile internet, cloud computing, big data, and Internet of Things are playing an increasingly important role in the transformation and upgrading of traditional industries. The prevention and control of animal diseases should adapt to such changes and realize deep integration with the Internet. The animal health information systems should be integrated based on “Internet+” to form a rationally structured, coordinated, and vertical animal health information system. ① Establishing a modern tracing system from farm to dining table based on the electronic quarantine certificates of animal production and slaughter. The whole process of animals from birth to slaughter should be tracked, which will facilitate the rapid identification of diseased animals and those at the risk of exposure, thus containing the spread of diseases. At the same time, technical means should be provided for mobile supervision as well as regional prevention and control. ② Promoting animal health informatization and integration of related information. The cross-regional, cross-administration level, and cross-department businesses should be coordinated in terms of animal immunization, disease surveillance, quarantine, transportation supervision, slaughter supervision, and

harmless treatment, thus promoting information sharing and improving the management and services of disease prevention and control institutions. ③ Presenting the national animal health information on one map. The basic information of slaughter companies, transportation vehicles, highway checkpoints, animal marking, animal farms, animal disease diagnosis and treatment institutions, and veterinary laboratories, as well as the business information of breeding volume, transportation of animals and animal products, animal disease surveillance, and harmless treatment should be presented on a map in combination with the distribution of wild animals, terrain, and road network for guiding emergency response, resource allocation, analysis modeling, surveillance, and warning.

(6) Scientific and technological support. During the prevention and control of COVID-19, China’s public health system determined the whole genome sequence of SARS-CoV-2 and isolated the strain within one week and timely shared the data to the world. China also launched a variety of testing reagents by stages, which satisfied the domestic demand of diagnosis and testing. Moreover, Chinese scientists published articles on *The Lancet* and *N Engl J Med* within two weeks, rapidly and accurately describing the clinical manifestations as well as the epidemiological characteristics and transmissibility of the virus. Therefore, it is necessary to strengthen the role of animal disease prevention and control institutions in scientific and technological support. ① Strengthening the research on disease diagnosis technology. At the early stage of an epidemic, the public health system should timely isolate the pathogen, confirm the cause, and develop and evaluate vaccines and diagnostic reagents. ② Strengthening the research on the law of epidemics. The public health system should carry out modeling to provide a scientific basis for decision-making. ③ Strengthening the development of comprehensive prevention and control technologies. Technical means tailored to local conditions should be provided for frontline epidemic prevention.

3.2 To enhance the support for the animal disease prevention and control system

The support for the animal disease prevention and control system should be enhanced referring to the reform direction and pilot work of the National Health Commission^[3,4].

(1) Strengthening the construction of the talent team. The Guiding Opinions on National Animal Disease Prevention and Control Agency Compilation Standards should be released timely to make clear the setting of institutions, functional positioning, and staffing standard for the animal disease prevention and control system to meet the basic requirements for clinical investigation of animal diseases, emergency response, and public welfare animal health services. The proportion of professional and technical posts in various levels of animal disease prevention and control

institutions should be increased, and the rigid requirements for papers and scientific research should be canceled for the title evaluation of grassroots professional and technical personnel.

(2) Guaranteeing the expenditure for relevant personnel and work. The expenditure for personnel in grass-roots animal disease prevention and control institutions should not be lower than the average level of public welfare institutions of Class I. The pilot measures such as guaranteeing the level of Class I public welfare institutions and managing the level of Class II public welfare institutions need to be explored. The relevant allowances, such as that for toxicity and harm, should be provided for the personnel and veterinarians.

(3) Strengthening the infrastructure construction. The implementation of the *National Plan for Animal and Plant Protection Improvement (2017–2025)* should be accelerated. Specifically, the standards for the construction of provincial, municipal, and county-level animal disease prevention and control centers should be formulated and issued to realize the serological tests at county-level laboratories, serological and pathogen tests at municipal laboratories, and pathogen tests at provincial laboratories. It is essential to establish inter-provincial highway animal health checkpoints and designate passages for the mobile supervision on animals. Besides, efforts should be made to build a unified animal husbandry and veterinary information sharing system which will realize the tracing of the animal epidemic prevention information from breeding, transportation to slaughter.

(4) Consolidating the foundation of animal epidemic prevention at the grassroots level. Grid-based management of animal epidemic prevention should be implemented based on the three levels of region, village, and farm. Veterinary stations should be established in towns or regions, with the business, finance, and personnel managed by the county government and providing services in towns. If the station cannot be set up, professionals should be arranged to take

charge of animal epidemic prevention and the necessary office space, cold-chain facilities, reagents and consumables, and operating expenses should be ensured. The compensation for village-level animal epidemic prevention staff should be reasonably determined referring to the income level of local village cadres. Furthermore, commissioners for animal disease prevention at the township or village level should be specially invited considering the amount of livestock and poultry, service scope, and regional environment.

(5) Supporting veterinary service organizations to supplement the government-led public welfare veterinary services. The government and market resources should be fully used, and the scopes of public services and social services for animal disease prevention should be reasonably defined. Practicing veterinarians should be fostered. The animal disease prevention cooperatives (service enterprises), large enterprises, animal diagnosis and treatment institutions, and animal disease detection agencies should be encouraged to carry out comprehensive services including immunization, testing, disinfection, harmless treatment, and technical consultation.

References

- 1 Xinhua News Agency. President Xi Jinping chairs the 12th session of the Central Commission for Comprehensively Deepening Reform to emphasize the improvement of the system and mechanism for the prevention and control of epidemics and construction of the sound national public health emergency management system. *People's Daily*, 2020-02-15 (01) (in Chinese).
- 2 Wu S. Study on Major Animal Epidemic Emergency Management in China. Beijing: Academy of Military Medical Sciences, 2014 (in Chinese).
- 3 Long H, Hu M. Hubei emphasizes system construction of reform for accelerating modernization of public health governance. *Hubei Daily*, 2020-07-07 (01) (in Chinese).
- 4 Special Expert Group for Control of the Epidemic of COVID-19 of the Chinese Preventive Medicine Association. Recommendation on the modernization of disease control and prevention. *Chinese Journal of Epidemiology*, 2020, 41(4): 453–460 (in Chinese).



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