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Developing an international public health cooperation mechanism for the cruise industry

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The cruise industry has suffered heavy setbacks owing to the COVID-19 pandemic outbreak. Domestic and global pandemic control measures— involving rules varying across countries as well as distinct legal systems— were escalated. We aimed to illustrate the need to establish a public health cooperation mechanism for the cruise industry. First, we analyzed the legal dilemma pertaining to pandemic prevention and control in cooperative situations; namely, the legal loopholes in the prevention, control, and rescue of cruise ships. Second, we focused on international collaboration during cruise ship rescues amid the pandemic, exploring solutions for current industry problems. Third, by analyzing Chinese practices in cruise-related areas, this paper guides the development of a public health cooperation mechanism for the cruise industry. In sum, we call upon the international community to develop such a mechanism within the scope of international law in terms of public health security and pandemic prevention. Research methodology: This is a practical research paper. Per our analysis of the United Nations Convention on the Law of the Sea and International Health Regulations of the World Health Organization, we studied the global legal issues pertaining to cruise epidemic prevention and control by sorting out legal regulations. We conclude that an international cooperation mechanism for cruise epidemic prevention and control should be established to ensure the cruise industry's sustainable development.

KEYWORDS

cruise industry, COVID-19, cooperation mechanism, international obligations, public health

1 Introduction

Cruise ships are important vehicles for sightseeing at sea level serving tourists from all over the world (Wang, 2020). Most cruise ships have airtight cabins equipped with central air conditioning systems to facilitate air circulation, thus making all passengers breathe the same air. During the voyage of a cruise ship, if there are unknown air-spread pathogens, docking and replenishment at the port may cause them spread in the coastal states (Ward, 2020). On January 31, 2020, the World Health Organization (WHO) held a press conference and classified the COVID-19 pneumonia outbreak as a Public Health Emergency of International Concern (PHEIC). With the escalation of domestic and international control measures, the negative impact on economic activities, that on the cruise industry, has become apparent, thus giving rise to a number of issues that need to be addressed. When the cruise ship with infected passengers floating on the sea, they could not be rescued in time. This could result in an uncontrollable spread on board, posing a threat to the safety and life of the crew and passengers. Prevention is an international issue that calls for public health cooperation. Ships carry tourists and crews from different countries, thus requiring the balance of interests of the flag state, coastal states, states at the port of call, and the state where the cruise company belongs (Bert et al., 2014). Developing a cooperation mechanism in the field of cruise public health is important to coordinate the interests of these stakeholders. It is also urgent to clarify the rights and obligations of those countries related to cruise ships under international law to facilitate such cooperation.

First, we analyzed loopholes in relevant legal systems and explored the jurisdiction-related problems in the legal system surrounding cruise ship navigation, highlighting the absence in the function of jurisdiction regarding the flag state, and the lack of division between the jurisdiction over, and responsibility for, cruise ships. Second, we examined the obligations and responsibilities of cruise companies and the application of the domestic and international laws of port states. Lastly, we provide suggestions on resuming industry activity, utilizing China's practices in pandemic control.

2 Legal dilemma of pandemic prevention and control in cruise ship industry cooperation

Cruise ships were refused entry to the port or disembarkation by coastal states due to the COVID-19 infected people on board (World Health Organization and Regional Office for South-East Asia, 2011). Given the highly infectious nature of the disease, coastal states' control measures vary considerably. For example, crews and passengers on *Diamond Princess* were not allowed to go

ashore by the port state and were required to be quarantined on the ship. Coastal states can refuse entry to the ports for the purpose of protection of domestic public health and security (Choquet and Awa, 2021). However, when this happens, the flag state cannot implement control, resulting in a delay of rescue actions and an outbreak on board that cannot be controlled, further resulting in a distressful situation for the navigating cruise ship (Wondirad, 2019).

On February 21, 2020, the International Maritime Organization (IMO) and the WHO issued an "IMO-WHO Joint Statement on the Response to the COVID-19 Outbreak," designed to assist countries in ensuring the implementation of health measures in international traffic and trade with minimal interference, and encouraged member states and international organizations to disseminate it as widely as possible. The joint statement pointed out that although the WHO did not recommend any travel or trade restrictions, countries around the world will take measures, including delaying customs clearance or refusing entry, which may cause serious disruption of international maritime traffic (National Institute of Infectious Diseases, 2020). Judging from the above analysis, pandemic prevention and control on cruise ships is an international dilemma. When a cruise ship is docked at a port, it involves coordination of various interests of the flag states, coastal states, the port state of call, and the states for cruise company (Yoshifumi, 2015). On this backdrop, inconsistent approaches adopted by countries, especially those leading to unnecessary expanded infection, reflect the loopholes and deficiencies in the international maritime law system (Holland et al., 2021). These loopholes include the absence of the functions of the subject of the cruise flag state jurisdiction, the problem of the division between the powers and responsibilities of the cruise jurisdiction, the issue of the obligations and responsibilities of the cruise company, and the "ambiguity" of the application of domestic and international laws by the port state.

The problems that cruise ships are confronted with in the pandemic prove the deficiency of the existing laws and regulations.

2.1 Ambiguous division of powers and responsibilities in a cruise ship's jurisdiction

Article 92 of the United Nations Convention on the Law of the Sea (UNCLOS) provides that "Ships shall sail under the flag of one State only and, save in exceptional cases expressly provided for in international treaties or in this Convention, shall be subject to the exclusive jurisdiction on the high seas." Article 33 stipulates that the coastal state may exercise, within the contiguous zone, "the right to prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea." Under these provisions, the

flag state jurisdiction applies to ships on the high seas, and under Article 56, the exclusive economic zone (EEZ) applies the high seas provisions. Thus, for health matters such as the COVID-19 pandemic, the jurisdiction of the ship is clear when the ship sails in the EEZ and on the high seas, and under the jurisdiction of the coastal state within 24 nautical miles.

Although the UNCLOS regulates the jurisdiction of coastal and flag states in certain areas, in reality, the application of maritime rules and regulations to cruise ships is also limited by the stipulations of specific contracts between countries (Tirrell and Elizabeth, 2021). The issue of cruise ship jurisdiction could be inconsistent, thus making the rights and obligations of the parties involved in pandemic prevention and control more complicated and even controversial (Zhao and Sun, 2021). This is particularly acute for those cruise ships whose flag state, actual control state, and port state are not the same country. When they are in the high seas, the flag state is obliged to exercise jurisdiction over its own ships. However, during navigating and docking, the division of responsibilities between the flag state and the port state is not clear under the current maritime legal system. Especially in the field of public health and security for cruise ships, when the COVID-19 pandemic is escalating, the continuity and uncertainty of the situation make it increasingly difficult to simply divide the rights and obligations according to state boundary jurisdiction. In reality, when the cruise ship is ashore, there is a concurring jurisdiction between the flag state and the port state. This overlapping area mirrors the deficiency of the current IMO maritime convention system in terms of the division of powers and responsibilities in cruise ship jurisdiction. Hence, there is an urgent need to establish a cooperation mechanism with the contribution of flag states, port states, and coastal states to control the spread of the pandemic.

2.2 Difficulty of fulfilling obligations and responsibilities in an emergency

The rights, obligations, and responsibilities of a cruise company are normally based on commercial contracts signed between it and the port state. Since they share common economic benefits, the ship's company and the port state of call are required to assume the corresponding rescue obligations in the event of a health emergency, such as the pandemic. For example, the 2005 International Health Regulations (IHR), Annex IV on "Technical requirements pertaining to conveyances and conveyance operators" stipulates the responsibilities of cruise operators:

Conveyance operators shall facilitate:

- (a) inspections of the cargo, containers and conveyance;
- (b) medical examinations of persons on board;
- (c) application of other health measures under these Regulations; and
- (d) provision of relevant public health information requested by the State Party.

According to the specific contract of the cruise transportation in some countries, the cruise company shall perform its obligations in accordance with the relevant rules. These rules and provisions mainly regulate the cruise line's obligation in respect of ensuring the safety of navigation technology, such as the rescue of shipwrecks, but lack much about the prevention and control of infectious diseases. There are some regulations focusing on the prevention and control of intestinal infectious diseases but none that are relevant to the prevention and control of respiratory infectious diseases such as COVID-19. Accordingly, it can be seen that the obligations and liabilities of the cruise ship operating company during the pandemic are incomplete. This gap could be filled by strengthening international public health and security cooperation.

2.3 Ambiguity between the application of domestic and international law in the port state

According to the relevant provisions of Article 27 IHR, "the competent authority may implement additional supplementary health measures, including isolation of the conveyances" if necessary, and the port state is entitled to take sanitary measures, including quarantining the affected conveyance. The requirement of a mandatory quarantine before entry to the port could be supported by certain legal authorities. In light of the Vienna Convention on the Law of Treaties Article 27, "a State may not invoke its internal law as justification for its failure to perform a treaty obligation." In the context of the pandemic, however, there is "ambiguity" between the application of domestic law and international law in the way that the port state handles the cruise.

For example, there is no clear international provision that supports the denial of entry to an infected conveyance by port states. Article 28 of IHR states that "A ship or aircraft cannot be prevented from calling at a port of entry in the area for reasons of public health." It also stipulates that "If the necessary maintenance of insurance measures is not sufficient, an order may be made to proceed to the nearest suitable point of entry." This indicates that the IHR does not provide a legal basis for port states to refuse entry to a cruise ship even if there is an infectious disease on board (Molenaar, 2021). It is only if there are no adequate medical services in that port that another "nearest" port may be ordered. Additionally, certain crucial definitions

concerning quarantine measures are obscure, such as the difference between the legal concepts of “quarantine of a ship” and “quarantine of the entire crew on board.” Quarantine of a ship is the isolation of the ship itself, which has been defined in the section on plague in the Ship Sanitation Manual initiated by the World Health Organization. The general aim is to ensure that port facilities maintain hygienic conditions free of contamination and infection vectors. Regarding the quarantine of infected people, IHR Article 18 provides that the ship arriving with infected persons on board could be quarantined by the health authorities.

Regulation 39(2) of the IHR stipulates that, except as specifically provided in these Regulations, isolation shall not be used as a substitute for *in situ* examination unless the health authorities consider that the risk of transmission of infection by the suspected infected person is extremely serious. In the International Ship Sanitation Manual prepared by the World Health Organization (WHO), in relation to port measures, reference is made to “the diagnosis on board of a suspected (...). Immediately after the occurrence of a case of disease, specialist medical advice should be sought (...). (...) the competent port authorities may, depending on the circumstances, need to arrange medical evacuation or make special arrangements for the landing and hospitalization of patients and for laboratory diagnosis (...). Screening of cases, contact tracing and quarantine of asymptomatic persons may need to be arranged by the competent port authorities.” Many countries have provisions in their domestic legislation, such as laws on entry, which do not allow the entry of infected persons (Klein, 2020).

Although the IHR does not specify whether quarantine should be on board or ashore, the fact that an infected person is not allowed to enter the country does not mean the coastal state and flag state should stay put. Conversely, the coastal or flag state could lend a hand by sending a medical ship or providing medical supplies to the cruise ship’s home port or for isolated people ashore (Liu and Chang, 2020). However, these cooperation obligations could not be found in any international public health convention for cruise ships.

Due to the lack of cruise ship laws and regulations during a pandemic, the establishment of a cooperation mechanism is an urgent need. In summary, by identifying the legal loopholes in the prevention, control, and rescue measures against COVID-19 outbreaks on cruise ships, the rights and obligations of the relevant countries in the international maritime legal framework can be clarified to allow for the construction of a more cooperative mechanism.

In this regard, it is recommended that the IMO and WHO shall negotiate the division of powers and cooperative responsibilities for public health and pandemic prevention and control on cruise ships. It is urgent to initiate a public health international cooperation agreement and draft the document to clarify the cooperation obligations of all parties. It is also

important for coastal countries to adopt detailed regulations and laws on public health for cruise ships in their domestic legal systems. By providing clearer and more specific rules to follow, states will fulfill their obligations and exercise their rights under international law in a cooperative manner.

3 Cooperation for cruise ship rescues during the pandemic

In the international community, there are several cooperative legal work in the cruise industry. Based on the provisions for the protection of seafarers’ rights and interests in the framework of the international laws of the sea and relevant state responsibilities, international organizations such as the IMO, the International Labour Organization (ILO), and the WHO have issued guidance on issues related to seafarer performance and assistance under the impact of the pandemic.

Regulation 2.5 of Maritime Labour Convention 2006 stipulates that seafarers are entitled to repatriation without any cost under the conditions specified in the Convention. It also provides that member states shall facilitate the repatriation and the replacement of the crews serving on ships that call at its port or pass through its territorial or internal waters. In addition, in accordance with Article 6(7) of the Seafarer’s Identity Documents Convention, which was revised in 2003, the member states shall grant entry for embarkation or repatriation of seafarers with valid identity documents. IMO also issued a 12-step plan document to assist its member states to tackle problems concerning seafarer’s shift changes. It serves as a guideline and provides some elaborated regulations for member countries to handle repatriation and replacement in a proper manner. Member states are encouraged to properly adjust their prevention measures in the light of the pandemic situation in ports, and actively participate in the 12-step plan. Through carrying out this plan, coastal states could implement and promote the shift change roadmap for seafarers, thus striving for the maximum convenience for ship crews. However, the implementation of this 12-step plan is still a dilemma. Many countries refuse to offer entry-exit ship change and repatriation or provide on-shore medical services for seafarers.

In China, the Ministry of Transport has issued a series of guidelines for the treatment of sick and injured crew members caused by the pandemic. The International Chamber of Shipping and the International Transport Workers’ Association (ITUA) have called for the protection of seafarers’ legal rights and recommended that member states treat international seafarers in the same way as crew and medical personnel on international flights, granting them the status of “key workers” and the right to leave the ship. China has responded positively and issued guidelines to clarify the rescue of crew members of Chinese ships while abroad during the new pandemic, promising that, if the coastal or port state refuses to provide help, the government

will resort to diplomatic assistance. At the same time, China also refined the measures to rescue Chinese crew members on foreign ships abroad. These provisions aim to protect the “civil rights” of Chinese crew members, to give priority to “human safety,” and to respect the principle of “obligation erga omnes” under international law.

4 Cooperative initiation and practices: The case of China

4.1 China’s cooperation policy

The COVID-19 pandemic outbreak has highlighted the huge humanitarian crisis and public health risks in the cruise ship industry (Hu and Li, 2022). During the past two decades, the industry has developed rapidly in China, and it is also an important hotspot for cruise passengers from all over the world. In the pandemic, China has always kept an open, cooperative, and responsible attitude and promptly informed the WHO and relevant countries of the national pandemic situation. China has displayed willingness to share experience and to provide support and assistance to countries in need. For example, it recommended that relevant international organizations strengthen communication, exchange opinions, and establish a joint management and control mechanism, and urged the implementation of prevention and control measures against cruise outbreaks.

At the same time, China advocated being people-oriented and establishing international cooperation mechanisms that could mobilize the division of labor and cooperation between flag, port, and coastal states; provide medical and psychological assistance to the crew and passengers; and ensure effective prevention and control of the pandemic. Based on the principle of relevance, in accordance with the laws and regulations under the IMO and WHO, flag, port, and coastal states should cooperate to protect human health. A cooperation mechanism could be established by issuing a guideline or treaty amendment to the joint prevention, control, and rescue cooperation obligations between countries involved in outbreaks on cruise ships, which should refine and clarify the public health rights and obligations of international passengers. Such a mechanism could facilitate prompt prevention and control in similar pandemic situations, and will ensure more effective salvage regimens in the future.

4.2 China’s cooperation practices

4.2.1 Cooperation in the emergency disposal program

At present, in China, there are domestic quarantine management measures for the entry and exit of cruise ships,

which are led by the Customs and signed by the Customs and Excise Department as a certification of conformity. Based on the experience accumulated from the pandemic outbreak, the relevant country authorities take the lead in introducing a cooperative reporting mechanism for cruise ships.

Second, the Chinese government promotes positive publicity in the media and counters public concerns about the safety of cruise travel. Regarding the cooperation and control of public health and safety on cruise ships, the government has provided assistance to the *Costa Serena* cruise ship in Tianjin Port and the *Costa Venetia* cruise ship in Shekou Port, Shenzhen. Overriding everything, through resolute action and powerful resource scheduling, the port state timely and effectively fulfilled its rescue obligations and the danger was eliminated at an incipient stage. This reflects the importance of constructing a cooperation mechanism for cruise public health and fully demonstrates China’s guiding ideology in the pandemic situation, serving the interests of the entire society.

Third, as for the resumption of cruise travel, taking the Chinese cruise industry as an example, the Ministry of Transport of the People’s Republic of China supports qualified cruise companies and cruise ships and actively participates in the Hainan Cruises’ pilot of “destinationless” routes after the outbreak. It suggests that local cruise ships do not dock but only cruise on the sea in the recent while. At the same time, the development of local cruises should be further strengthened and the construction and operation of “the five-star red flag cruises line” within China’s territorial sea should be therefore promoted. Concerning the convenience of multi-point docking for foreign cruise ships, it stipulates on the international law cooperatively that port state supervision and inspection should include the inspection of the ship’s validity and crew certificates. Hence, in China, strengthening supervision and guaranteeing the safety of navigation is an important factor in the resumption of cruise travelling. The cruises resume reinspection is also required in strict accordance with the inspection standards and cycles determined by the Asia-Pacific Port State Supervision Memorandum Organization that China joined. The implementation of port state supervision and inspection should be addressed in an internationally cooperative way. At the same time, the international community should cooperate on the handling of cruise public health safety emergencies, and strive to formulate a cooperative and targeted emergency response plan to effectively guarantee the sustainable and healthy development of the cruise industry.

For example, the Chinese government has proposed the launch of the 21st Century Maritime Silk Road Joint Contribution and Sharing Plan for Marine Public Services, calling on countries along the Belt and Road to jointly build marine observation and monitoring networks, and increase technical assistance for marine observation and monitoring infrastructure in the Belt and Road developing countries. The government also shows willingness to strengthen international

cooperation in the application of the Beidou and remote sensing satellite navigation systems in the maritime field, and to provide satellite positioning and remote sensing information application and services for countries along the Belt and Road. This kind of plan and technology are especially important building a maritime cooperation mechanism during a pandemic.

4.3 Chinese laws and regulations concerning cooperation

The Chinese government raises awareness among crews and passengers regarding public health and pandemic prevention and carries out law popularization education. Due to the cruise ocean voyage, information update is relatively slow. China has prepared the “COVID-19 Infection Protection Handbook” and “Legal Knowledge Questions and Answers on the Current Prevention and Control of COVID-19 Infection Pneumonia” on the embarkation instructions, covering the symptoms, prevention, and violation of public health and safety legal responsibilities.

Additionally, the Chinese government has formulated comprehensive cruise navigation safety regulations. The Ministry of Transport took the lead in further revising and perfecting the Maritime Traffic Safety Law, with special provisions on cruise navigation safety. For example, the ship party further improves the health declaration system for passenger boarding, rescue drills before the ship is launched, and publicity and education of passengers. All cabins are equipped with complete medical equipment, and also install air disinfection machines in the cabins and panoramic rooms to strengthen the home port strengthens public health construction to ensure the safety of China’s port.

Now that the pandemic in China has been effectively controlled and the number of infected people worldwide has increased, China should seize the historic opportunity to introduce its experience in pandemic prevention and control to the international community and seize the right to speak in the global pandemic governance system, systematize and share its experience in rescuing cruise ships at the port of Tianjin with the international community. It is recommended that countries establish international cooperation mechanisms in the areas of public health and pandemic prevention and control in the cruise ship industry, starting with framework agreements under international law.

5 Recommendations for establishing a cooperation mechanism

In international law, the “obligation erga omnes” principle is primarily embodied in the protection of the international community’s interests as a whole. With the development of

international law, the scope of this principle tends to gradually expand. The protection and cooperation in areas such as environmental protection, common heritage of mankind, and public health also fall within its scope (Gostin, 2014). In order to better comply with the legal rule, in the field of cruise ship public health and safety in relation to pandemics, it is advisable to develop a convention or treaty that combines the autonomy of the parties concerned with international cooperation and to establish a specific legal mechanism for cooperation, which will facilitate the fulfilment of obligations.

For example, requiring states to disclose information will help flag, coastal, and port states to jointly carry out research on cruise ship outbreaks. In this regard, consideration should be given to proposing our own solutions to the “cruise ship dilemma” in the international law system.

Concerning the construction of international cooperation mechanisms, the key to pandemic prevention and control on cruise ships is the following additional legislation solutions: first, the responsibility of the flag state to prevent and control cruise ship outbreaks as mandated by Article 91 of UNCLOS—“Each State shall fix the conditions for the grant of its nationality to ships (...). There must exist a genuine link between the State and the ship.”—and Article 94(6) regarding the obligations of the flag State—“A State which has clear grounds to believe that proper jurisdiction and control with respect to a ship (...) take any action necessary to remedy the situation.” This means that the flag state has jurisdiction over the cruise ship on the high seas requiring assistance in the event of a pandemic, which would include assistance at sea on the high seas and in relation to the public health of the cruise ship. When COVID-19 was found on the high seas and spread rapidly, and that by the time the cruise ship entered the waters under the port state jurisdiction, the infection was widespread. As a flag state cannot be blamed for a COVID-19 outbreak even if the ship is in the port state jurisdictional waters, it is suggested that the IMO should clarify the specific regulations and implementation methods of the flag state jurisdiction over cruise ships in the development of maritime safety regulations and public health treaties involving ships. Port state maritime authorities should also cooperatively refine and upgrade the flag state jurisdiction system for cruise ships in domestic maritime regulations (Fujita et al., 2017). With a practice of cooperation, the pandemic can be much better controlled.

Second, in cases where a port state receives an infected cruise ship and carries out public health assistance, it is recommended that a “cooperative responsibility” mechanism be established to allocate port state and flag state responsibilities, with port state jurisdiction taking precedence and flag states actively coordinating and cooperating. Given the international, hermetic, and mobile nature of cruise ships, the prevention and control of infectious diseases is usually more difficult than onshore. In the event of a pandemic, it is difficult for any country to act alone. Moreover, under the principle of universal

jurisdiction, the state of nationality of crews and passengers is also responsible for the health and safety of its own citizens on board, and the vessel and should actively rescue its own nationals, for example by promptly sending a special plane to collect them. Under the International Convention on Economic, Social and Cultural Rights and from the perspective of international human rights law, the state of nationality has an obligation to protect the right to health of its citizens. It is recommended that in the field of international health law, an international cooperative mechanism under international human rights law could be considered to regularly review the domestic health legal systems and initiatives of the states and gradually harmonize their domestic health legal systems with international standards. It is also recommended that cooperation between flag, port, and coastal states should be strengthened to provide medical and psychological assistance to crews and passengers, and to ensure effective pandemic prevention, control, and relief. In the light of this incident, it is recommended that all states involved in cruise ships, under the auspices of the IMO or the International Health Organisation, issue a guideline or treaty amendment that establishes a cooperative mechanism. By joint action, states involved in cruise ship outbreaks could clarify the rights and obligations of passengers involved in public health incidents on international shipping lines. If a treaty amendment is not feasible, a cooperative mechanism for joint rescue that complies with a soft law guideline could guide future health incidents on cruise ships.

Third, the principle of proportionality in responsibility should be introduced into the rescue obligations and cooperative mechanisms to allocate cooperative responsibilities and obligations between cruise lines, port states, and coastal states. The state where the shipping company is located, including the flag state, should jointly enjoy the economic benefits and at the same time bear the corresponding responsibilities and obligations (Lorenčič et al., 2020). Cruise companies are contractually obligated to take on specific obligations to ensure the safety of their crews and passengers. At the same time, relevant legislation is needed to ensure cooperative and effective measures for the prevention and control of cruise ship outbreaks. This should include international guidelines and national laws.

Through additional legislation in these three areas, the establishment of an international cooperation mechanism for the prevention and control of cruise ship outbreaks will be promoted.

6 Conclusion

The COVID-19 pandemic outbreak has disrupted the cruise industry's growth. Future research and directions and limitation is as follows: the current legal dilemma and loopholes in

maritime law have exacerbated the ability to address health issues on cruise ships during the pandemic. Future research should examine the resolution of international conflicts in terms of maritime jurisdiction and balancing the national interests of stakeholders, appealing to the establishment of a cooperation mechanism in the cruise industry. The present article is limited regarding the construction of a cooperation mechanism, which is critical in three areas: the flag state's jurisdiction, port state's obligations, and registry state for the shipping company. With the practice of cooperation among countries and related international agencies such as the IMO and WHO, additional creative regulations are required for cruise health management. All countries should exert efforts to contribute to developing a public health cooperation mechanism for pandemic control in Cruise.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

Author contributions

WW and LL participated in conception of the research ideas, structure design, and revisions. WW wrote the first draft of the manuscript and provided implications of the study fundings. LL made critical revisions on the Manuscript. Both authors gave final approval of the version to be published.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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