

Original Article

Qualitative Analysis of the Perception and Acceptability of Pathogen Transport among Housewives Using Focus Group Interviews

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SUMMARY: We conducted focus group interviews to understand how residents of Japan feel about the transport of pathogens. Twelve randomly selected housewives, who had no special knowledge regarding the topic before the interview, expressed their opinions in 2 separate meetings regarding pathogen transport. The results of the interviews were analyzed by the KJ method. The analysis found that although the transport of pathogens is universally recognized to be necessary, there is not clear consensus on the exact methods of transport, the positive and/or negative value of such information, and how clearly and/or uniquely to label containers, packages, compartments, vehicles, and conditions used for such transportation. Further studies to improve the skills of both the providers and receivers of such information (a technique of risk communication) are necessary.

INTRODUCTION

Pathogens should be studied to prevent and/or minimize the effect of disease outbreaks, and this requires the isolation of these pathogens to confirm or disprove doctors' diagnoses. Local hospitals, however, often do not have the facilities that are required for such testing. Therefore, it is often necessary to transport pathogens to facilities such as the National Institute of Infectious Diseases (NIID), universities, research institutes, and vaccine manufacturers that have the technology necessary for the identification and treatment of the pathogens.

When transporting pathogens or clinical samples, hermetically sealed containers are used to ensure biosafety during transport and to prevent the contamination of the contents by other microbes. The World Health Organization publishes guidance for the transport of pathogens (1), which we follow for domestic transport. The International Air Transport Association Dangerous Goods Regulations also allows the international transport of pathogens by air, as long as dedicated containers are used and regulations are observed (2). However, the transport of pathogens and clinical samples is provided by very few courier services in Japan and there is no clear commitment that these providers will continue their services because of the negative image attached to the term "pathogen." It is urgent that a reliable pathogen transport system be established because of the threat of pandemics caused by new infectious diseases such as severe acute respiratory syndrome

or influenza.

Whether a courier service transports pathogens or not depends on the policy of the company. Moreover, this policy is influenced by public opinion. However, to our knowledge, there have been no reports of research or structured surveys concerning how the public views pathogen transport.

The purpose of this research is to understand the views of the public regarding the transport of pathogens and to help in improving these views in the future. Our research used focus group interviews (FGI) to qualitatively survey and analyze the public's understandings of pathogen transport. FGI has been a very popular research tool for studying marketing or business trends for more than 30 years. The FGI is an informal discussion undertaken by a group of 6–12 individuals who are selected for a specified topic in relation to a specific situation; it helps in inducing emotions and revealing the attitudes and values of the interviewees (3–5). The FGI can explain the behavior and motivation of the group as well as improve or change their opinion regarding a specified topic (6).

MATERIALS AND METHODS

We adopted the FGI method for this qualitative survey. Interviews were carried out in Tokyo under the theme "transport of clinical samples as a part of the countermeasures against infectious diseases."

The interviewees comprised housewives in their 30s–50s, who were registered as monitors for a research company and lived in Tokyo or its surrounding prefectures. We recruited 12 housewives, and divided them into 2 groups consisting of 6 members each. Attributes of the interviewees are listed in Table 1.

The interviews were conducted in line with the interview guidelines that had been prepared in advance. First, a short explanation regarding pathogen transport

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Table 1. Attributes of interviewees enrolled in the group interviews

| Group A | | | Group B | | |
|---------|------------|-------------------------------|---------|------------|-------------------------------|
| Age | Prefecture | No. of speaking ¹⁾ | Age | Prefecture | No. of speaking ¹⁾ |
| 37 | Tokyo | 13 (4) | 32 | Kanagawa | 3 (1) |
| 39 | Tokyo | 33 (7) | 33 | Tokyo | 65 (14) |
| 42 | Kanagawa | 77 (14) | 43 | Kanagawa | 60 (2) |
| 44 | Tokyo | 18 (2) | 45 | Tokyo | 44 (2) |
| 52 | Tokyo | 14 (6) | 51 | Tokyo | 84 (17) |
| 59 | Saitama | 47 (12) | 54 | Kanagawa | 4 (2) |

¹⁾: The parenthesis indicate the number of questions.

The interviewees are comprised from housewives in their 30s to 50s, who were registered as a monitor of a research company and lives in Tokyo and surrounding prefectures. They spoke each other without reserve, and did not speak specific members who have special knowledge. The number of speaking includes the opinions, the ideas, and the questions.

was provided by a panel of biosafety experts who responded to questions as the housewives had no special knowledge of the topic. This provided the minimum necessary information before the discussion. Then, they were interviewed as a group. The 2 main questions in the interview were “Did you know that pathogens must be transported to multiple institutions for repeated testing for pathogen surveillance as a part of infectious disease prevention?” and “What do you think of the present pathogen transport methods?” Then, the interviewees were given the opportunity to handle real pathogen transport containers and to hear explanations on pathogens and clinical sample packaging and specifications as set by the United Nations. The interviewing time was set at approximately 1.5 h for each group.

We analyzed the results by the KJ method (7,8). Digitally recorded interviews were transcribed word for word, and each transcription was itemized using 1 statement for 1 item. We then reconfirmed the content through comparison with the recorded interviews. After removing the comments by the facilitator and questions from participants, the remaining remarks were extracted, cut into strips concerning each item, and labeled. Subsequently, the labeled strips were grouped according to similarity of concepts as indicated by the phrases, and a schematic diagram was formulated for analysis. The analysis was performed with extreme care to exclude any subjective prejudices or assumptions on the part of the analysts. These operations were performed by a collaboration of researchers of infectious disease and social scientists.

RESULTS

In the analysis of FGI by the KJ method, 49 of the extracted items were chosen. The content of each item contained comments of the interviewees regarding present pathogen transport, the measures used to continue pathogen transport smoothly, and the reasons why pathogen transport is needed. Consequently, we classified these items into 3 categories as “Present status,” “Future measures,” and “Necessity of pathogen transport.”

As shown in Table 2A, 6 extracted items were classified in the category “Present status.” Two items indi-

cated that pathogen transport was not known to interviewees and the other 4 items indicated their perception regarding such transport. Accordingly, we divided the category “Present status” into 2 subcategories as “Lack of information about pathogen transport” and “The matter of image of pathogens.”

Forty-one of the extracted items revealed ways to continue pathogen transport smoothly in the future, and they were classified into the category “Future measures.” This category was divided into 2 subcategories as “To load together or separately” and “To disclose or not to disclose information” based on the substance of the extracted items (Table 2B).

Some extracted items in the category “Future measures” were related to each other, and we connected these items by arrows as indicated in Fig. 1.

The former subcategory includes 2 middle categories “Adopt mixed loading” and “Do not adopt mixed loading” as shown in Table 2B. Figure 1A shows the relationship of extracted items in the former middle category. The focus of this middle category is the extracted item “I am not concerned about mixed loading if appropriate measures are taken,” and the other 3 items “Place a dedicated container in the vehicle,” “Transport by specially trained operators only,” and “Select reliable carriers” are the requirements for grouping items together. An extracted item “Place a dedicated container in the vehicle” is also related to another item “Providing a dedicated container costly.” Because these items conflict with each other, the arrow is drawn by a dotted line. Although there were 4 extracted items revealing the ideas on transport method except for mixed loading in the latter middle category, 1 extracted item “Transport by motorbike messengers” was not connected to any item and the other 3 extracted items were connected to items of opposed relationship (Fig. 1B).

The latter subcategory “To disclose or not to disclose information” was divided into 3 middle categories “Disclose information,” “Do not disclose information,” and “Not sure about disclosing information” as shown in Table 2B. Only the middle category “Disclose information” had 2 bottom categories “Disclose that pathogens are being transported” and “Appeal proactively.” This is because the extracted items in this middle category can be divided into 2 more categories of disclosing information of being transported and of how to appeal to the public. As shown in Fig. 1C, there are 2 extracted items indicating the methods of disclosure “Attach a visual symbol to the vehicle” and “Sound a siren” and an extracted item “It is more reassuring to know that pathogens are being transported” is connected to these items in a former bottom category. This is because the latter item explains the reasons for the other 2 items. Furthermore, an extracted item “Attach a visual symbol to the vehicle” was referred to the other 4 items indicating the assumed results for this measure. Although an extracted item of these 4 items conflict with this measure, the other 3 items received the contents of this item affirmatively.

The bottom category “Appeal proactively” is the category that included the most extracted items. These items could be divided into clusters by their make-up, and we supported this bottom category by adding 3

Table 2. Schematic diagram of each category of the focus group interviews using the KJ method

| A | | | | | |
|---------------------------------|--|---|---|----------------|---|
| Category | Subcategory | Extracted item | | | |
| Present status | Lack of information about pathogen transport | I was surprised to hear the explanation. I did not know that it contributes to our life. | | | |
| | The matter of image of pathogens | I feel reassured when information on containers is provided. I am concerned about mixed loading. It is a matter of image not fact that mixed loading is actually unfavorable. It can never be completely safe because humans are involved. | | | |
| B | | | | | |
| Category | Subcategory | Middle category | Bottom category | Extracted item | |
| Future measures | To load together or separately | Adopt mixed loading | | See Fig. 1A | |
| | | Do not adopt mixed loading | | See Fig. 1B | |
| | To disclose or not to disclose information | Disclose information | Disclose that pathogens are being transported | | See Fig. 1C |
| | | | Appeal proactively | | See Fig. 1D |
| | | Do not disclose information | | | It is also misleading to have only some knowledge. There are people who would abuse such information. |
| | | | Not sure about disclosing information | | I do not think all people are well-intentioned. People would feel more at ease without knowledge about pathogen transport, but it could lead to a panic in the case of an emergency. |
| | | | Conduct an opinion survey. | | |
| C | | | | | |
| Category | | Extracted item | | | |
| Necessity of pathogen transport | | Pathogen transport is definitely required. Pathogen transport must not be discontinued. | | | |

The diagram of the KJ method process explains stepwise approach from grouping labeled extracted items of interviews with the contents of the given phrase to the bottom categories and then to the subcategories with the addition of relevant item slips, and finally to three large categories of “Present status,” “Future measure,” and “Necessity of pathogen transport.”

(A) The category “Present status” includes 2 contents. One is that the participants did not know about pathogen transport. Another is a matter of image of pathogens that land courier service offered by only a limited number of door-to-door service providers. These indicate the participants realized the necessity of pathogen transport.

(B) The category “Future measures” includes the largest number of extracted items and is divided into 2 subcategories and 1 extracted item. Moreover, these subcategories divided into 2 or 3 middle categories. Even though the antagonistic middle categories each other, all of middle categories are constructed from the extracted items on the assumption that pathogen transport must be continued.

(C) The extracted items included in the category “Necessity of pathogen transport” are the most important contents in the focus group interviews (FGI). This category indicates the emotions and value of the participants for pathogen transport that the purpose of the FGI.

minimum clusters “Who,” “What,” and “How” as shown in Fig. 1D. In the minimum cluster “Who,” 2 extracted items “Carriers’ appeal” and “National and/or local governments’ appeal” were connected to the same extracted item “If public relations activity is successful, other carriers may follow suit” finally. In the other 2 minimum clusters “What” and “How,” 2–4 extracted items were connected to 1 extracted item, respectively.

Incidentally, 3 middle categories “Disclose informa-

tion,” “Do not disclose information,” and “Not sure about disclosing information,” were grouped into the category “Future measures,” which was connected to the middle category “Adopt mixed loading,” because these 3 middle categories consisted of the opinions on the assumption of mixed loading. Although the directions of these middle categories are different, the extracted item “Conduct an opinion survey” is thought to be the measuring method that decides the direction. Consequently, these 3 middle categories are connected

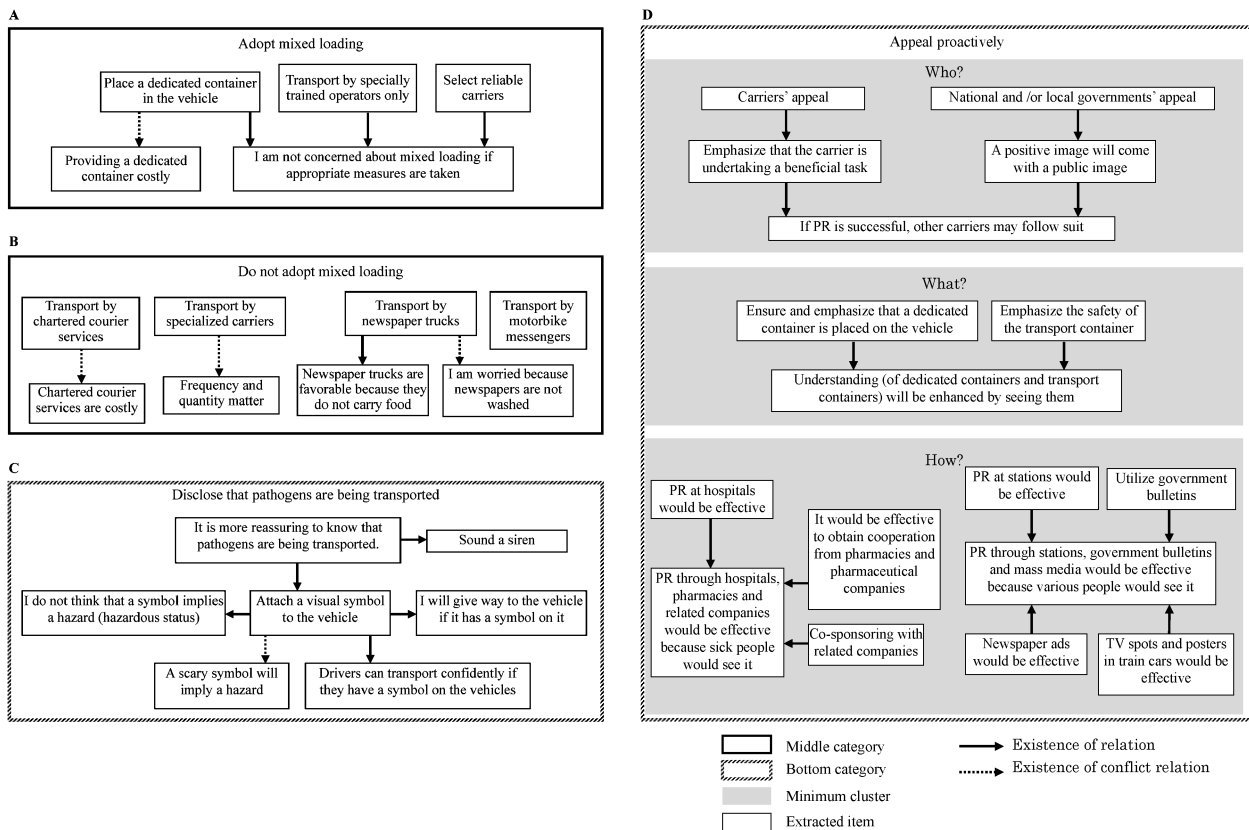


Fig. 1. Relations of extracted items in subcategories “To load together or separately” and “To disclose or not to disclose information” of the schematic diagram of focus group interviews using the KJ method. Categorized items were boxed in to squares of several sizes and the relations of the categories are shown by arrows. (A) Three extracted items of the ideas of measuring methods about mixed loading connected to a common extracted item. Each item indicates affirmation of mixed loading, although we can appreciate appropriate measures are needed. (B) Three extracted items of the other measuring methods replacing mixed loading connected to different 3 items indicate denying of these ideas, respectively. (C) An extracted item of the idea of disclosing that pathogens are being transported connected to 4 extracted items indicate participants’ emotions. Three of these items affirm to attach a visual symbol to the vehicle. (D) This bottom category explains the methods of appeal about pathogen transport and it is divided into 3 minimum clusters according to the content. Two to 4 extracted items of appeal method connect to 1 item expressing the reason or the predictable result in each minimum cluster.

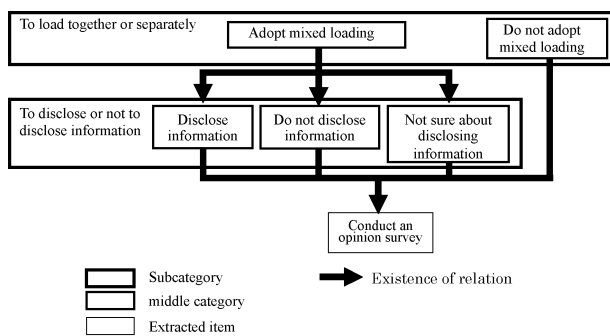


Fig. 2. Relations of each subcategories, middle categories or extracted item in category “Future measures” of the schematic diagram of focus group interviews using the KJ method. A subcategory “Adopt mixed loading” connects to the other 3 subcategories and 1 extracted item except for the subcategory “Do not adopt mixed loading” in the category “Future measures”. The relation indicates that the existence of some measuring methods about mixed loading information is appeared.

to this extracted item as shown in Fig. 2.

In the results, 40 of the extracted items in the category “Future measures” could be applied to each of 2 subcategories. Only 1 extracted item “Conduct an opinion

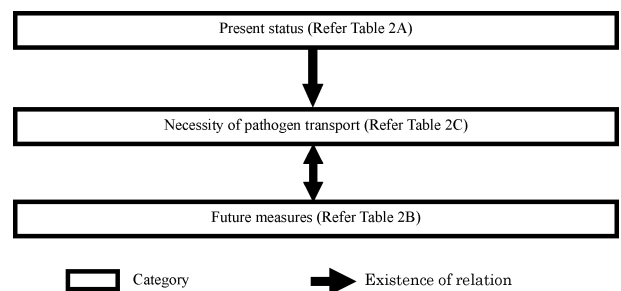


Fig. 3. Relations of each categories of the schematic diagram of focus group interviews using the KJ method. This figure shows the conclusion of the analysis. The categories “Present status” and “Future measures” connect to a category “Necessity of pathogen transport.” The connection of latter 2 categories is mutual each other.

survey” did not belong to a group because the meaning of this item discorded with any subcategories and all contents in these 2 subcategories connected to this item finally (Table 2B and Fig. 2).

Two extracted items shown in Table 2C have a common meaning (i.e., why pathogen transport is needed). Accordingly, these items are classified into a new cate-

gory “Necessity of pathogen transport” without a subcategory or a bottom category.

There is no extracted item denying pathogen transport. Furthermore, all items in both categories of “Present status” and “Future measures” are connected to the category “Necessity of pathogen transport.”

This is because these 2 categories are based on continuing pathogen transport without exceptions. Moreover, the category “Necessity of pathogen transport” is influenced by the category “Future measures,” for example, “Pathogen transport is necessary and future measures are also necessary.” Consequently, we drew a 2 directional arrow between these categories. These results were indicated in Fig. 3.

DISCUSSION

Method of survey: The degree of public understanding of pathogen transport in Japan is unclear; hence, we decided to adopt a qualitative research method to elucidate the baseline level of public perception. There are various methods for qualitative research, such as the participative observation, individual interview, group interview, life history analysis, and the FGI (9–12). The FGI is defined as “informal discussion undertaken by some individuals, who are selected under a specified topic in relation to a specific situation” (6). The FGI is performed “to evaluate the reasons behind interviewees’ perception, their attitudes and emotions, and perceived solutions” (3). During the FGI, participants may be stimulated by each other’s opinions and further develop their discussion into themes that had not been predicted by the researchers, which is beneficial in identifying grounds for new hypothesis and findings (13). From this perspective, it was considered appropriate that various emotions and views of individuals should be extracted.

Interviewees: When the FGI is carried out, 1 or 2 focus groups comprising of 6–12 individuals with common backgrounds are sufficient for investigative research (6). However if 1 or more specialists are included in the group, it becomes difficult for other members to give their opinions. Moreover, the others cannot speak freely if the specialist dominates (6).

Two groups of 6 housewives were selected as interviewees for this survey, assuming an absence of knowledge on the present status of pathogen transport and related experience for this survey. We prepared and used dedicated interview rooms instead of the NIID building. Accordingly, an intellectual did not speak and all members were allowed to voice their honest opinions in this interview (Table 1).

Method of analysis: The KJ method was invented by Jiro Kawakita. It is in order to systemize the results of heterogeneous brainstorming results by discuss with experts (14). The KJ method is a tool for generating ideas and resolving problems by collecting a variety of information on various facets of the proposed issue and interrelating and classifying the collected information. This method is adopted for analyzing qualitative research in diverse fields (14–18) and is often used for analysis of questionnaire records (14–17). The KJ method is unique because it does not distinguishes the thoughts of individuals from those of the group, both in

principle and in practice (7). In this research, this is considered the most effective method to investigate and identify the relationship and overview of how people recognize pathogen transport after the relevant information has been provided. Means are considered to have been taken to prevent prejudice and assumptions by the inclusion of individuals who are not specialized in infectious disease and pathogen transport in the analytical team.

Results of interview extraction analysis: Based on the analysis using the KJ method, the subcategory “Lack of information about pathogen transport” was made (Table 2A). Accordingly, it was confirmed that none of the interviewees had knowledge regarding pathogen transport, and many questions were given by the interviewees, as shown in Table 1.

Because some questions were based on the efficiency of containers for pathogen transport, we provided information on the quality of the containers during the interviews. As a result, an extracted item “I feel reassured when information on containers is provided” was added as seen in Table 2A. This was thought to result in the removal of anxiety about pathogen transport by providing information on the container because “panic can be prevented by providing information” (19). On the other hand, an extracted item “I am concerned about mixed loading” was made in the same subcategory. This is thought to reflect that “no matter how much people are guaranteed safety by specialists, they do not necessarily feel reassured” (20) as shown in an extracted item in Table 2A “It is a matter of image not fact that mixed loading is actually unfavorable.” It supposed that these extracted items came from the idea that “recognition of risk by people is grounded on the statistical sensitivity that no matter how low the probability is, as long as the probability is not zero, it signifies ‘it does occur’ to the involved people” (21) as shown in the extracted items in Table 2A “It can never be completely safe because humans are involved.” Therefore, this suggests that the images of pathogen transport among the interviewees include the problem of safety based on scientific grounds.

From these considerations, it is necessary to seek a method to settle these problems, considering that there is a gap between risk assessment based on scientific grounds and the risk recognition of the public.

Three extracted items to solve this problem by avoiding mixed loading were shown in Fig. 1B. These extracted items connect to the different negative extracted items. On the other hand, 3 extracted items concerning measures about the assumptions of mixed loading connect to a common affirmative extracted item (Fig. 1A). These results indicate that the measures compiled by the public are possibly led by the calm consideration and judgment based on the adequate information.

As a concrete example of these measures, 2 bottom categories were made. First, 2 extracted items showing the methods of disclosing how pathogens are being transported “Attach a visual symbol to the vehicle” and “Sound a siren” were picked in the bottom category “Disclose that pathogens are being transported” as shown in Fig. 1C. Next, another bottom category “Appeal proactively” indicates the method of appeal (Fig. 1D). The reason for these proposals is indicated in the

extracted item in the former bottom category as “It is more reassuring to know that pathogens are being transported.” This reason agrees with a report that people always seek information (19).

However, as shown in the extracted items in Table 2B “It is also misleading to have only some knowledge,” insufficient knowledge causes problems sometimes. For example, when the aftershock forecast issued by the Coordinating Committee for Earthquake Prediction included an inadequate explanation on the difference between magnitude and seismic intensity, it resulted in incorrect rumors during the Great Hanshin-Awaji Earthquake in 1995 (22). Consequently, as indicated in the extracted item “Conduct an opinion survey” in Fig. 2, it might be necessary to investigate before disclosing information. Moreover, it was considered necessary to examine what information to disclose, including methods of transport, and to clarify the reasons for classified information or to sort out all relevant information. From this, the following measure for communication with nation will be needed.

It is reported that effective communication about risk to the public and the media has an essential role within the public health measuring system (23). This effective communication about risk is called “risk communication.”

The techniques of risk communication are applied in a way that never causes panic (19). In the FGI, as an extracted item “People would feel more at ease without knowledge about pathogen transport, but it could lead to a panic in the case of an emergency” was picked up; if the method of risk communication is wrong, a panic might be caused. Accordingly, “how to practice risk communication” seems to be the key point for solving the problems regarding pathogen transport. Although an extracted item “Conduct an opinion survey” is made for the problem of whether the information should be disclosed or not as shown in Fig. 2, it is thought that application of techniques of risk communication are necessary for the opinion survey. On the other hand, as shown in some extracted items in Table 2B that “There are people who would abuse such information” and “I do not think all people are well-intentioned,” disclosing information could possibly backfire.

Through this research, 2 key points in the “Present status” were confirmed: (i) the public does not have knowledge about the present status of pathogen transport, and (ii) the matter involves the public image regarding pathogens. It is thought that, at first, when we communicate with the public, we have to consider the former key point. In the FGI, the interviewees did not know about pathogen transport, nevertheless, they recognized that pathogen transport is necessary, based on information provided by the interviewees. This suggests that risk communication in the FGI was accomplished successfully; as shown in Fig. 3, the most important point of pathogen transport, “Necessity of pathogen transport,” is deduced by the interviewees. This also suggests that it is important for professional and other related individuals who understand the necessity of pathogen transport to maintain public health through infection testing, public health services, scientific research, vaccine development, and other health services, and to transmit relevant information to the

public through active communication. Next, it seems essential that bias created by the popular image of life-threatening pathogens be considered when we communicate with the public. The extracted items “It is a matter of image not fact that mixed loading is actually unfavorable” and “I am concerned about mixed loading” shows that the general dislike of mixed loading and the limited courier services are due to the unfavorable perception of pathogens.

In conclusion, it was thought that adequate methods of risk communication were needed to avoid a panic. With regard to information disclosure of pathogen transport and implementation of risk communication, all information should be provided in a manner that can be understood easily (24).

The research in both areas is new as public opinion is unclear and/or the public had not considered the existence of or the need for pathogen transport. This research is a strategic first step for future measures, and quantitative research is necessary in the future. The availability of this information is increasing and therefore, both the transporter’s handling techniques and the public’s rational appraisal of those techniques are expected to improve. Of course, at first, proper training regarding the packaging of pathogens is required.

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Conflict of interest None to declare.

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