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# Survey on the Current Status of the Regional Medical Collaboration System and Community Pharmacy Functions in Tokyo

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The aging of the society in Japan is rapidly progressing. The birth rate is declining and the aging population is growing in developed countries. Therefore, an integrated community care system is needed to ensure that older adults, in a severe state of need of care, can continue to live their own lives in accustomed communities until the end of their lives. To construct this system, pharmacies must establish a regional medical collaboration system in cooperation with regional medical institutions and other professionals. In this survey, to ascertain the status of initiatives leading to the establishment of a regional medical collaboration system in Tokyo and to understand the characteristics of community pharmacies that implement initiatives leading to the establishment of such a system, we analysed the responses obtained from the Tokyo Metropolitan Government in the community pharmacy functional information report and the Tokyo Metropolitan Government's independent published item report, and we studied measures to improve the construction of a regional medical collaboration system in the future.

In summary, 629 community pharmacies, less than 10% of the 6,483 community pharmacies analysed, worked on all four of the items listed in a regional medical collaboration system in the community pharmacy functional information report. In contrast, the number of community pharmacies that are not currently working on any of these items was 2,534. In addition, the characteristics of community pharmacies that have established a regional medical collaboration system include a large number of pharmacists, medicine stockpiles, and efforts to improve the quality and ambition of pharmacists.

**Key words**; community pharmacies, regional medical collaboration,
pharmacy function information provision system, pharmacy vision for patients

Received January 29, 2024; Accepted May 1, 2024

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## 1. Introduction

In recent years, the population in Japan have been rapidly aging, and the percentage of people aged 65 years or older in the total population is expected to reach 30.3% by 2025, of which the percentage of people aged 75 years or older in the total population is expected to increase to 18.1%.[1)] Declining birth rates and aging populations are advancing, even in developed countries. The rapid declining birthrate and aging population has led to an increase in public pensions and medical benefits, threatening the sustainability of the medical insurance system. Under such circumstances, there is a need to establish an integrated community care system that provides housing, medical care, long-term care, prevention, and life support in an integrated manner so that even if older adults become severely in need of long-term care, they can continue to live their own lives in accustomed areas until the end of their lives. The establishment of an integrated community care system is important not only for making the medical insurance system sustainable but also it has certain advantages for patients, such as the ability of community pharmacies to manage medication information in an integrated manner, the ability to take medicines with peace of mind, the ability to consult with pharmacists who can respond to emergencies 24 hours a day or on holidays when there are no community pharmacies, and the ability to provide instructions for medicine administration at home when it is difficult to visit a community pharmacy. Therefore, community pharmacies are required to play an important role in cooperation with regional medical institutions and other occupations.[2)]

Prescription receipt rates at community pharmacies in 2021 are expected to exceed 75%[3)], and the separation between prescription and dispensing is expected to continue to evolve. Under such circumstances, in the medical insurance system, the cost of total medical care, including dispensing, was approximately 2 trillion yen in the fiscal year 2021[4)], an increase of 7% when compared with the previous fiscal year. However, since community pharmacies are mainly dispensing medicines, they do not fulfil their intended functions, and there are opinions that the significance and advantages of the separation of prescription and dispensing are not felt by patients and other health care providers.[5)] The Ministry of Health, Labour and Welfare has been promoting family pharmacists and family pharmacies in the "pharmacy vision for patients" formulated on 23 October 2015 with the aim of creating a patient-oriented separation of prescription and dispensing so that patients and other professions can feel the merits of the separation of prescription and dispensing. To realise this, a system of accreditation of pharmacies affiliated with community collaborative pharmacies and specialised medical institutions cooperating with pharmacies has been in effect since 1 August 2021.

The pharmacy functional information provision system was started on 1 April 2007 as part of efforts to share information for patients to make appropriate choices regarding community pharmacies[6)]. The pharmacy functional information provision system is the one whereby the prefectural government publishes necessary information to enable patients and local residents to make appropriate choices of community pharmacies. The prefectural government has pharmacy proprietors

who report information on the functions of community pharmacies at the time specified by the prefectural government at least once a year. Functional pharmacy information is reported to prefectural governments through paper or electronic questionnaires. In Tokyo, pharmacy information is reported to the Tokyo Metropolitan Government using not only the "community pharmacy functional information report" but also the "Tokyo Metropolitan Government's independent published item report (hereinafter referred to as the "original item report")". The community pharmacy functional information report, which is used while reporting pharmacy functional information, has been updated as needed. Several items have been added in the report since 2019 to indicate whether there is a system that enables initiatives that lead to the establishment of a regional medical collaboration system, such as "efforts to understand and collect pre-avoid cases", "existence of a system to share information at the time of discharge" and "existence of a system to provide medical institutions with information, pertaining to recommendations for medical consultation". In Japan, where the aging population is rapidly increasing, it is important to establish a system of collaboration between regional medical institutions with family pharmacists and family pharmacies as one of the core areas. Therefore, it is necessary to enhance the functions of community pharmacies so that patients can select appropriate community pharmacies not only from the viewpoint of operating hours and locations but also from the viewpoint of function. In addition, in order for all community pharmacies to enhance their functions, it is important to understand the characteristics of community pharmacies which have already established a regional medical collaboration system, and for this purpose, it is necessary to clarify the state of establishment of a regional medical collaboration system. Under such circumstances, study on accreditation standards for community collaborative pharmacy using community pharmacy information located Chiba prefecture has been reported[7]. However, there was not studies using community pharmacy information and studies revealing the status of the establishment of a regional medical collaboration system as far as we surveyed. Therefore, it was considered that the establishment of a regional medical collaboration system could be clarified by using administrative data, such as the pharmacy functional information report, which was conducted as a complete enumeration.

In this survey, to investigate the necessary measures for the further establishment of a regional medical collaboration system, we divided community pharmacies into groups according to the implementation status of initiatives leading to the establishment of a regional medical collaboration system. A survey was conducted to understand the relationships and trends between each group, and the size and human resources of community pharmacies.

## 2. Methods

1. Analytes

In this survey, the data used were extracted and analysed using the response information from the community pharmacy functional information report and the original item report, which summarised the pharmacopoeia function information as of 1 November 2020. Information on the responses to

these reports was provided by the Pharmaceutical Affairs Section, Health and Safety Division, Bureau of Public Health, Tokyo Metropolitan Government, and was the responses were from a total of 6,691 community pharmacies in Tokyo. Of these, a total of 6,483 community pharmacies were included in the analysis, excluding community pharmacies that answered "No" regarding "Yes/No of designation as a pharmacy covered by the health insurance law" and those that answered "0" regarding the number of patients who received prescriptions.

2. For grouping

Figure 1 shows the items described in "(4) Regional medical collaboration system" in the community pharmacy functional information report, which is an important item to be addressed by community pharmacies to establish an integrated community care system.

In this survey, community pharmacies were grouped according to "(4) Regional medical collaboration system, as shown in Figure 2, to establish a regional medical collaboration system. However, the items related to medical collaboration in "(4) Regional medical collaboration system" in the pharmacy functional information report are divided into three separate categories, "(a) Efforts to understand and collect pre-avoid Cases", "(b) Efforts to protocol-based pharmacotherapy management (hereinafter referred to as "Efforts to PBPM")" and "(c) Efforts to introduce a formulary regarding collaboration of medicines collaborated

① Medical collaboration
  (a) Efforts to understand and collect pre-avoid cases
  (b) Protocol-based pharmacotherapy management (PBPM) initiatives
  (c) Efforts to introduce a formulary on medicine collaboration in collaboration with regional medical institutions, etc.
  (d) Other
② Participation in a regional medical information cooperation network
③ Existence of a system to share information at the time of discharge
④ Existence of a system to provide medical institutions with information pertaining to recommendations for medical consultation
⑤ Participation in awareness-raising activities for local residents

Figure 1 Items of a regional medical collaboration system

Group 1: Community pharmacies that answered "Yes" for all items
Group 2: Community pharmacies that answered "Yes" for two or more items, including items related to medical collaboration (excluding community pharmacies that answered "Yes" for group 1)
Group 3: Community pharmacies that answered "Yes" only for items related to medical collaboration
Group 4: Community pharmacies that answered "Yes" to one or more other items, excluding items related to medical collaboration
Group 5: Community pharmacies who answered "None" for all items

Figure 2 Details of each group

by regional medical institutions" (hereinafter referred to as "Efforts to introduce regional formularies"). In this survey, if any of the items were answered "Yes" according to the report format, the items related to medical collaboration were judged to be "Yes" and analysed accordingly.

Of "(4) Regional medical collaboration system", the items "(d) Other" in "medical collaboration" and "participation in awareness-raising activities for local residents" were excluded from the criteria for grouping in this survey because they were not considered as direct indicators for the establishment of collaboration systems between medical institutions.

In this survey, the respondents were divided into groups according to the number of items in "(4) Regional medical collaboration system" for which they responded "Yes". Therefore, the more items the respondents answered "Yes", it was judged that the more likely they were to have a regional medical collaboration system in place.

3. Evaluation items

This survey was conducted to determine the relationship between the sizes of the five aforementioned groups and community pharmacies' human resources to identify trends in community pharmacies by establishing a regional medical collaboration system. As items related to the size of the community pharmacy, "the number of prescriptions demand" and "the number of pharmacists in the community pharmacy (full-time equivalent)" were extracted from the community pharmacy functional information report, and "the number of ethical medicine stockpiles" and "the number of generic medicine stockpiles" were extracted from the original item report.

As items related to community pharmacy human resources, the presence or absence of "case review meeting", "patient satisfaction survey", and "certified pharmacists in trained" were extracted from the community pharmacy functional information report. These aforementioned seven items were used as endpoints, and a survey was conducted.

4. Analysis method

To ascertain the relationship between each group and the size of the community pharmacy, the following items were extracted as related to the size of the community pharmacy: the number of prescriptions demand, the number of pharmacists in the community pharmacy, the number of ethical medicine stockpiles, and the number of generic medicine stockpiles. The Kruskal–Wallis test was performed for each extracted item to analyse whether there were statistically significant differences between any of the groups or differences in distribution. Subsequently, the Steel–Dwass test was performed to determine the statistical significance of the differences between the groups for items with statistically significant differences.

Analysis of the pharmacy human resources included the presence or absence of "case review meetings", "patient satisfaction surveys", and "certified pharmacist in trained". The Cochran-Armitage test was performed on the extracted items in Groups 1 to 5 to check for any tendencies. Subsequently, a chi-square test was performed to determine the presence or absence of statistically significant differences between the groups. Residual analysis was performed to determine which groups were significantly different. In the residual analysis, adjusted normalised residuals

Table 1 Implementation status of a regional medical collaboration system

| | Number of community pharmacies that answered "Yes" | Ratio of community pharmacies that answered "Yes" |
|---|---|---|
| Medical collaboration | 3,630 | 56.0 |
| Efforts to understand and collect pre-avoid cases | 3,612 | 55.7 |
| Efforts to PBPM | 380 | 5.9 |
| Efforts to introduce regional formularies | 227 | 3.5 |
| Participation in a regional medical information coordination network | 1,408 | 21.7 |
| Existence of a system to share information at the time of discharge | 1,063 | 16.4 |
| Existence of a system to provide medical institutions with information, pertaining to recommendations for medical consultation | 1,757 | 27.1 |

Total number of community pharmacies: 6,483

were calculated from the difference between the measured and expected values; if the adjusted absolute residuals exceeded 1.96, the measured values were considered significantly different from the expected values.

All the statistical analyses were performed using Microsoft Excel and JMP Pro 15. The significance level (α) was set at 5% for all statistical tests.

5. Research ethics

This study contains nonhuman-published information. Consideration was taken to ensure that the name of the pharmacy could not be identified.

## 3. Results

1. Implementation Status of a Regional Medical Collaboration System

Table 1 shows the ratio of each item in "(4) Regional medical collaboration system" in the community pharmacy functional information report. The items with the highest implementation rate were items related to medical collaboration (56.0%). This was followed by "a system to provide medical institutions with information, pertaining to recommendations for medical consultation" (27.1%) and "participation in a regional medical coordination network" (21.7%). The item with the lowest implementation rate was found to be "a system to share information at the time of discharge" (16.4%).

Figure 3 shows the results of grouping the 6,483 pharmacies analysed. There were 629 community pharmacies (9.7%) in Group 1, 1,301 (20.1%) in Group 2, 1,700 (26.2%) in Group 3, 319 (4.9%) in Group 4, and 2,534 (39.1%) in Group 5.

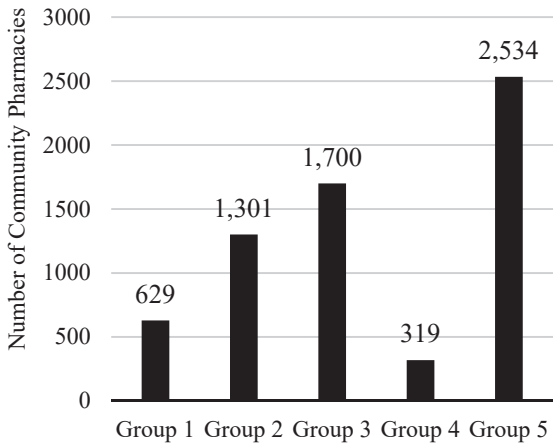


Figure 3 Results of community pharmacy grouping

Table 2 Regional medical collaboration system and community pharmacy scale

| | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Kruskal-Wallis test *P value* |
|---|---|---|---|---|---|---|
| | Mean ± SD<br>Median [interquartile] | Mean ± SD<br>Median [interquartile] | Mean ± SD<br>Median [interquartile] | Mean ± SD<br>Median [interquartile] | Mean ± SD<br>Median [interquartile] | |
| Prescription demand | 18,645±13,322<br>15,434 [10,137-23,818] | 19,225±13,302<br>15,869 [10,305-24,835] | 18,217±14,161<br>14,937 [9,196-23,564] | 13,072±11,816<br>10,428 [6,108-15,899] | 13,258±14,735<br>10,404 [6,022-16,131] | *p<0.001* |
| Number of pharmacists (Conversion to full-time equivalent) | 4.08±2.65<br>4.00 [2.00-5.00] | 3.80±2.53<br>3.00 [2.00-5.00] | 3.43±2.30<br>3.00 [2.00-4.00] | 2.70±2.02<br>2.00 [2.00-3.00] | 2.57±2.17<br>2.00 [1.00-3.00] | *p<0.001* |
| Number of ethical medicine stockpiles | 1,598±488<br>1,500 [1,300-1,800] | 1,532±594<br>1,430 [1,248-1,766] | 1,512±550<br>1,400 [1,200-1,793] | 1,232±628<br>1,160 [800-1,500] | 1,100±732<br>1,000 [700-1,376] | *p<0.001* |
| Number of generic medicine stockpiles | 620±2,270<br>500 [391-620] | 493±216<br>460 [375-600] | 482±210<br>450 [350-590] | 415±296<br>350 [250-500] | 340±225<br>300 [200-438] | *p<0.001* |

2. Regional Medical Collaboration System and Pharmacy Scale

Table 2 shows "the number of prescriptions demand" and "the number of pharmacists in the community pharmacies" related to the size of the pharmacy and the results of "the number of ethical medicine stockpiles" and "the number of generic medicine stockpiles" related to the size of the community pharmacy. Table 2 presents the mean, median, and interquartile values for each of the aforementioned four items. The Kruskal– Wallis test showed a significant difference in p-values of less than 0.001 for all parameters.

"The number of prescriptions demand" tended to be lower in Groups 4 and 5 than in Groups 1 to 3; however, there was no significant difference between Groups 1 to 3 and Groups 4 and 5. In the comparison of groups 1 and 2 to 5, Group 1 showed a statistically significantly higher prescription demand than Groups 4 and 5. No significant differences were found between Groups 1 and 2 ($p = 0.89$) or between Group 1 and 3($p = 0.66$). A comparison of Group 2 and Groups 3 to 5 showed that Group 2 had a significantly higher prescription demand ($p = 0.036$, $p < 0.0001$, $p < 0.0001$). A comparison of Group 3 with Groups 4 and 5 revealed a significantly higher prescription demand in Group 3 ($p < 0.0001$, $p < 0.0001$). There were no significant differences seen between Groups 4 and 5 ($p = 1.00$).

"The number of pharmacists in the community pharmacy" was highest in Group 1 and lowest in Group 5. When comparing Group 1 and Groups 2 to 5, the number of pharmacists enrolled in Group 1 was significantly higher ($p = 0.028$, $p < 0.0001$, $p < 0.0001$, $p < 0.0001$). The number of pharmacists enrolled in Group 2 was significantly higher than in Groups 3 to 5 ($p < 0.0001$, $p < 0.0001$, $p < 0.0001$). In addition, the number of pharmacists in Group 3 was significantly higher than in Groups 4 and 5 ($p < 0.0001$, $p < 0.0001$). Finally, although the number of pharmacists in Group 4 tended to be higher than

in Group 5, there was no significant difference between them ($p = 0.38$).

"The number of ethical medicine stockpiles" was the highest in Group 1 and lowest in Group 5. The number of ethical medicine stockpiles in Group 1 was significantly higher than that in Groups 2 to 5 ($p = 0.0071$, $p < 0.0001$, $p < 0.0001$, $p < 0.0001$). When comparing Groups 2 and 3 to Group 5, the number of ethical medicine stockpiles was significantly higher in Group 2 than in Groups 4 and 5 ($p < 0.0001$, $p < 0.0001$). The number of ethical medicine stockpiles in Group 2 tended to be higher than that in Group 3, but no significant difference was observed ($p = 0.31$). When Group 3 was compared with Groups 4 and 5, the number of ethical medicine stockpiles in Group 3 was found to be significantly higher ($p < 0.0001$, $p < 0.0001$). The number of ethical medicine stockpiles in Group 4 was significantly higher than that in Group 5 ($p = 0.0013$).

"The number of generic medicine stockpiles" was the highest in Group 1 and lowest in Group 5. The number of generic medicine stockpiles in Group 1 was significantly higher than seen in Groups 2 to 5 ($p = 0.0053$, $p < 0.0001$, $p < 0.0001$, $p < 0.0001$). When comparing Group 2 and Groups 3 to 5, the number of generic medicine stockpiles in Group 2 was significantly higher than that in Groups 4 and 5 ($p < 0.0001$, $p < 0.0001$). The number of generic medicine stockpiles in Group 2 tended to be higher than that in Group 3. However, no significant difference was observed ($p = 0.47$). In addition, when Group 3 was compared with Groups 4 and 5, the number of generic medicine stockpiles in Group 3 was found to be significantly higher ($p < 0.0001$, $p < 0.0001$). The number of generic medicine stockpiles in Group 4 was significantly higher than that in Group 5 ($p < 0.0001$).

3. Regional Medical Collaboration System and Human Resources

The Cochran–Armitage test, chi-square test, and residual analysis were performed for the presence or absence of "certified pharmacist in trained", "case review meeting" and "patient satisfaction survey" as items related to human resources described in the community pharmacy functional information report, respectively, and the results are shown in Table 3.

Regarding "case review meeting", the rate of implementation was the highest in Group 1 and the rate of implementation was the lowest in group 5. Analysis of residuals revealed that the implementation rate of "case review meeting" in Groups 1, 2, and 3 tended to be higher than that in another community pharmacies analysed. In addition, the implementation rate of case review meetings in Group 5 tended to be lower than that in the other community pharmacies analysed. There was no significant trend in the implementation items in "(4) Regional medical collaboration system" or in the implementation rate of case review meetings in Group 4. There was a significant decreasing trend seen in the implementation rate of community pharmacies in each group where case review meetings were held, from Groups 1 to 5 ($p < 0.0001$).

Regarding the "patient satisfaction survey", the rate of implementation was highest in Group 1 and lowest in Group 5. Residual analysis showed that the implementation rate of the patient satisfaction survey in Groups 1, 2, and 3 tended to be higher than that seen in the other community pharmacies analysed. In addition, the implementation rate of the patient satisfaction survey in Groups 4 and 5 tended

Table 3 Analysis results for human resource related items

| | | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Mean (%) | Chi-square test *P value* | Cochran-Armitage test *P value* |
|---|---|---|---|---|---|---|---|---|---|
| Presence or absence of case review meetings | Implementation rate (%) | 85.2 | 72.2 | 58.8 | 53.9 | 33.7 | 54.0 | $p<0.001$ | $p<0.001$ |
| | Adjusted Normalised residuals | 16.54 | 14.72 | 4.60 | -0.02 | -26.25 | | | |
| Presence or absence of patient satisfaction surveys | Implementation rate (%) | 26.7 | 18.6 | 18.9 | 5.3 | 4.7 | 13.4 | $p<0.001$ | $p<0.001$ |
| | Adjusted Normalised residuals | 10.32 | 6.18 | 7.83 | -4.34 | -16.46 | | | |
| Presence or absence of certified pharmacists in trained | Retention rate (%) | 96.7 | 94.3 | 86.1 | 66.8 | 44.0 | 71.5 | $p<0.001$ | $p<0.001$ |
| | Adjusted Normalised residuals | 14.77 | 20.49 | 15.61 | -1.86 | -39.02 | | | |

Table 4 Representative number of certified pharmacists reported

| | Median (persons) Interquartile (the first-and third-quartile) | Number of community pharmacies (Percentage) |
|---|---|---|
| Number of certified pharmacists in trained | 2 [1-3] | 4,626 (71.4%) |
| Number of certified pharmacists in kampo medicines and crude drugs | 1 [1-1] | 192 (3.0%) |
| Number of authorized sports pharmacists | 1 [1-1] | 555 (8.6%) |
| Number of certified practical pharmacists | 1 [1-1] | 1,090 (16.8%) |
| Number of pharmaceutical lifetime management certified pharmacists | 1 [1-1] | 20 (0.3%) |
| Number of pharmacists completing training in health support pharmacies | 1 [1-2] | 1,674 (25.8%) |

Total number of pharmacies: 6,483

to be lower than that of the community pharmacies included in the analysis. There was a significant decreasing trend in the implementation rate of community pharmacies in Groups 1 to 5, where the patient satisfaction survey was conducted ($p < 0.0001$).

With regard to "certified pharmacist in trained", the retention rate was highest in Group 1 and lowest in Group 5. The performed residual analysis showed that the retention rate of certified pharmacists in Groups 1, 2, and 3 tended to be higher than that of the community pharmacies analysed. The retention rate of certified pharmacists in Group 5 tended to be lower than that of the community pharmacies analysed. There was no significant trend found for the implementation items in "(4) Regional medical collaboration system" or the retention rate of certified pharmacists in Group 4. There was a significant decreasing trend in the retention rate of community pharmacies in each group, where certified pharmacists in training were employed from Groups 1 to 5 ($p < 0.0001$).

Table 4 shows the types of certified pharmacists and the median and interquartile values of the

number of certified pharmacists per community pharmacy reported in the community pharmacy functional information report. Except for trained certified pharmacists, the median number of certified pharmacists per pharmacy was one.

## 4. Discussion

1. Grouping Method

Community pharmacy functional information reports were grouped according to the items described in "(4) Regional medical collaboration system" in provision of services and regional medical collaboration system, which the community pharmacy considered as important items to be tackled by the community pharmacy to realise an integrated community care system. Notably, when responding to "efforts to understand and collect pre-avoid cases" in the items related to medical collaboration, as stated in the notice by MHLW [8], a guideline for when this item is answered "Yes" or "No" is provided. Specifically, if the following two points are satisfied, the respondent may reply "Yes". The first is to collect cases of avoidance of adverse health effects such as adverse reactions in community pharmacies and register them as "participating pharmacies" of the "near-miss" project under the project to promote medical safety measures in community pharmacies, if the relevant information is provided to medical institutions and other parties concerned. The second is to report events in which prescriptions were changed due to prescription inquiries during the previous year (1 January to 31 December) on the date specified by the prefectural government in the guideline for implementation of the pharmacy functional information provision system[9], which resulted in preventing patients from suffering harm to their health or failing to obtain the intended efficacy of a physician.

"Efforts to understand and collect pre-avoid cases" is an initiative in which pharmacists share the event with pharmacists working at other institutions with the aim of avoiding adverse reactions to patients. In other words, it is a source of information that directly affects the existence or absence of a regional medical collaboration system and may be an important factor in establishing such a system. Therefore, it is important to focus on constructing a regional medical collaboration system. However, in accordance with the notice by MHLW of the section in charge, community pharmacies can be answered that "efforts to understand and collect pre-avoid cases" is "Yes" because they participated in the collection of medical near-miss events, etc. in the project to promote medical safety measures at pharmacies and reported events that led to the prevention of patient health hazards, etc. as a result of prescription changes being made in response to prescription enquiries within an appropriate period of time. It is specified in Article 24 of the Pharmacists Act as the duty of pharmacists to prevent health hazards in patients by changing prescriptions based on prescription enquiries. In other words, community pharmacies that answered "Yes" for " efforts to understand and collect pre-avoid cases" because of changing prescriptions based on prescription enquiries are included. In light of these points, community pharmacies that are implementing "efforts to understand and collect pre-avoid cases" are not necessarily able to establish a regional medical collaboration system. Accordingly, reporting events that result in an enquiry into a prescription as an obligation of a pharmacist and a

change in the prescription resulting in preventing harm to patient health cannot be considered an important factor in establishing a regional medical collaboration system. Moreover, because it is difficult to accurately share individual patient information with medical institutions, it is unclear whether an event can be linked to patient information in the concerned medical institution when the pharmacy shares information about events that prevented the patient. Accordingly, community pharmacies that responded "Yes" to "efforts to understand and collect pre-avoid cases" cannot necessarily say that a regional medical collaboration system has been established, and it is therefore inappropriate to judge the state of implementation of efforts leading to the establishment of a regional medical collaboration system from this item alone. On the other hand, this effort requires collaboration with other medical institutions, and could be a relevant factor for establishment of a regional medical collaboration system. Thus, among the items in "(4) Regional medical collaboration system", it was considered appropriate to use not only items related to medical collaboration including "efforts to understand and collect pre-avoid cases" but also several other items as indicators for grouping.

2. Current Status of a Regional Medical Collaboration System in Tokyo

Focusing on the different components of a regional medical collaboration system, one role that pharmacies are required to play in an integrated community care system is pharmaceutical management, which is closely tied to the community. Only 27.1% of the community pharmacies answered "Yes" to "Existence of a system to provide medical institutions with information, pertaining to recommendations for medical consultation" that is thought to be of great value in the pharmaceutical management. To establish a regional medical collaboration system, that is, the separation of prescriptions and dispensing mainly for patients, it is essential to establish a system to share information obtained through interviews with community pharmacies with hospitals and clinics. Accordingly, improvements are required in community pharmacies that do not have a system to provide medical institutions with information regarding medical consultation recommendations.

Furthermore, 21.7% of pharmacies answered "Yes" to "Participation in a regional medical information coordination network" and 16.4% answered "Yes" to "Existence of a system to share information at the time of discharge in the items of a regional medical collaboration system. It is not possible to establish these items merely by establishing a system on the part of community pharmacies, and cooperation from medical institutions, such as hospitals, clinics, and organisations other than pharmacies, such as medical and pharmacy associations, is considered essential. Accordingly, pharmacies that responded "None" to these items cannot necessarily conclude that the development of a regional medical collaboration system is not progressing. However, even in the light of this, approximately 80.0% of the community pharmacies analysed were unable to establish a system, and the results were low. Therefore, it is considered necessary to take some measures from the community pharmacy side to increase regional medical care, for example, by proposing and holding joint training sessions with

other medical institutions, etc. to establish this system.

Of the 56.0% of community pharmacies that responded "Yes" to items related to medical collaboration, and 55.7% of community pharmacies responded "Yes" to "Efforts to understand and collect pre-avoid cases". On the other hand, since enquiries about prescriptions are prescribed in the Pharmacy Affair Act as the duty of pharmacists, it is surmised that enquiries about prescriptions are made more frequently than once a year in most community pharmacies. In other words, although the number of community pharmacies answered "Yes" for this effort may be predicted to be large because of the implementation of enquiries about prescription, in reality it was about half. In light of this point, community pharmacies that answered "Yes" to this effort likely included community pharmacies that had been collecting information on "efforts to understand and collect pre-avoid cases" rather than enquiries about prescriptions only. Therefore, there may have been a small number of community pharmacies that answered "Yes" to this effort because only the enquiry about prescriptions was made. Contrastingly, the implementation rates of "Efforts to PBPM" and "Efforts to introduce regional formularies" were low at 10.5% and 6.3%, respectively. In particular, the number of community pharmacies which were implementing these measures was considerably lower than that of other items in "(4) Regional medical collaboration system". However, these efforts cannot be made by community pharmacies alone; collaboration from a regional medical institution is essential. Therefore, it is necessary to improve not only community pharmacies but also medical institutions.

However, 39.1% of the pharmacies analysed were community pharmacies (Group 5) that did not implement any of the measures present in "(4) Regional medical collaboration system". Community pharmacies must undertake initiatives that will trigger regional medical collaboration to establish an integrated community care system. One of these measures is "Efforts to understand and collect pre-avoid cases", which had the highest rate of implementation among the community pharmacies analysed, in terms of "(4) Regional medical collaboration system".

3. Current State of Regional Medical Collaboration System in Pharmacy Size

As shown in Table 2, in terms of "the number of prescriptions demand", "the number of pharmacists in community pharmacies", "the number of ethical medicine stockpiles ", and "the number of generic medicine stockpiles", which are related to the size of community pharmacies, these four items were found to generally be relatively high in the group with many activities out of the items in "(4) Regional medical collaboration system". Specifically, in regard to "the number of pharmacists in community pharmacies", except for the results of the comparisons between Group 4 and 5, the number of pharmacists in community pharmacies increased as the group that implemented many items in "(4) Regional medical collaboration system" in the community pharmacy function information report, i.e., the group with the established a regional medical collaboration system was higher as the number of pharmacists were seen to increase. In addition, except for the results of comparisons between Groups 2 and 3, the number of ethical medicine stockpiles and the number of generic medicine stockpiles increased in the group

that implemented many items in "(4) Regional medical collaboration system" in the community pharmacy function information report; that is, the group with the established regional medical collaboration system increased the number of ethical and generic medicine stockpiles. Considering this point, it has been suggested that a system of regional medical collaboration should be in place for community pharmacies that have large stockpiles of ethical medicines and generics, community pharmacies that have numerous registered pharmacists, and community pharmacies that are able to perform their duties with comparatively high margins from the viewpoint of the number of registered pharmacists.

However, it has also been suggested that it is difficult to implement measures leading to regional medical collaboration in small-scale community pharmacies with few ethical and generic medicine stockpiles and community pharmacies with insufficient personnel when compared to pharmacy size. Accordingly, it is necessary to consider and implement measures such as adjusting the number of pharmacists to the size of community pharmacies to establish a regional medical collaboration system.

4. Regional Medical Collaboration System and Human Resources

Regarding human resources, such as the presence of case review meetings, the presence of patient satisfaction surveys, and the presence of certified pharmacists in training, meant the higher the number of community pharmacies in "(4) Regional medical collaboration system", the higher the implementation rate of case review meetings and patient satisfaction surveys, and the higher the retention rate of trained pharmacists. These three items are not necessary required in their daily work. Therefore, it led us to speculate that the quality or ambition of pharmacists who work on these items may be high. As shown in Table 3, it has been suggested that community pharmacies working on these items are able to establish a regional medical collaboration system. Therefore, it may be related to the establishment of a regional medical collaboration system and the involvement of pharmacists with higher quality and ambition. In addition, pharmacists working in community pharmacies are considered to be items that should be addressed in the future in order to establish a regional medical collaboration system. Accordingly, in addition to these items, it has been suggested that efforts to improve the quality and ambition of pharmacists in community pharmacies, such as participating in joint training sessions and study sessions, may eventually serve as a catalyst for advancing the development of a regional medical collaboration system. Therefore, it is necessary for pharmacies to promote these efforts.

In addition to the certified pharmacists in trained, as shown in Table 4, the other certified pharmacists reported were "certified pharmacists in kampo medicines and crude drugs", "authorized sports pharmacists", "certified practical pharmacists", "pharmaceutical lifetime management certified pharmacists", and "pharmacists completing training in health support pharmacies". The median number of certified pharmacists per pharmacy is one. When compared to the certified pharmacists in training, the number of community pharmacies with other certified pharmacists was considerably smaller. These results suggest that, except for community pharmacies with special backgrounds for obtaining these certifications, most of the community

pharmacies analysed were not in the process of obtaining certifications other than being certified pharmacists during training. In this survey, the enrolment status of other certified pharmacists was unknown, based on the data used.

5. Limitations

This survey was conducted among the community pharmacies present in the Tokyo Metropolitan Government. This survey analysed the community pharmacy functional information report and original item reports collected in accordance with the pharmacy functional information provision system. As mentioned earlier, the pharmacy functional information provision system is a system whereby the prefectural government publishes the information necessary for patients and local residents to appropriately select community pharmacies based on the information collected from the proprietors of community pharmacies. Therefore, these reports were prepared to collect basic information on community pharmacies, such as items indicating their size of community pharmacies and operating hours. Based on these reports, it was necessary to confirm the details of the implementation of the measures that led to the establishment of a regional medical collaboration system. However, it was difficult to confirm the details of the measures that led to the establishment of a regional medical collaboration system, since it would be calculated by whether the system enabling the implementation of the measures leading to the establishment of the system had been established in each item, that is, "Yes" or "No". Considering this point, the following four limitations were considered in this survey using administrative data.

The first is the lack of information on community pharmacies' attributes from simply collecting information from the community pharmacy functional information report and original item reports. This made it difficult to understand the characteristics of community pharmacies that were making efforts to establish a regional medical collaboration system. Information on the attributes of community pharmacies which is considered to be specifically lacking included information on the "prescription concentration rate" that allowed for judgments on the form of community pharmacies, so-called front-line pharmacies, pharmacies with a division of labour, etc., and information on the "existence of calculation by family pharmacists" that was considered necessary for the unified management of patient information. In addition, there were 3,612 community pharmacies (55.7%) that answered "Yes" for "efforts to understand and collect pre-avoid cases" that we used to classify the status of the establishment of a regional medical collaboration system. However, the number of community pharmacies that answered "Yes" for this effort based on the only cases in which enquiries about prescriptions were submitted was unknown. Although enquiries about prescriptions is the legal obligation for pharmacists, they are also one of important tools to share information about patients with other medical institutions. Therefore, these points were necessary to gain a detailed understanding of the implementation status of the initiatives, leading to the establishment of a regional medical collaboration system. However, in future surveys, it will be necessary not only to collect information from the community pharmacy functional information report and the original item reports, but also to prepare a questionnaire that includes information on the attributes of the

community pharmacy.

Second, community pharmacists' awareness was unclear. As aforementioned, from the items in the community pharmacy functional information report and the original item reports focused on community pharmacy information the awareness of pharmacists at community pharmacies was unclear, which is considered to be the most important factor in establishing a regional medical collaboration system. Therefore, to understand the implementation status of measures leading to the establishment of a more detailed regional medical collaboration system, it was considered necessary to investigate the awareness of community pharmacists regarding the provision of information to medical institutions and their attitudes toward the establishment of a regional medical collaboration system. Moreover, it is impossible to establish a regional medical collaboration system merely by raising awareness among community pharmacists. Therefore, in the future, it is necessary to survey the awareness of providing information to other medical institutions, including pharmacies, as well as pharmacists engaged in regional medical institutions, and to establish a regional medical collaboration system.

Third, there was a lack of information on the collaborations with medical institutions, including other community pharmacies, excluding the same corporations. It would be difficult to promote the establishment of a regional medical collaboration system without the opportunity to meet medical professionals working at other medical institutions and pharmacists in other community pharmacies. Increasing the opportunities for face-to-face interviews would likely trigger the establishment of a regional medical collaboration system. Therefore, it is considered necessary to investigate whether joint training sessions or study sessions were held and whether pharmacists collaborated with medical professionals working at other medical institutions.

Fourth, it uses only community pharmacy information located in Tokyo. These results do not necessarily correspond to the information on community pharmacies in all prefectures, as differences in geographical characteristics are not taken into account. However, the number of community pharmacies in all prefectures in 2020 was 60,951[10], of which approximately 10% were located in Tokyo. Therefore, it was considered meaningful to use only the information on community pharmacies located in Tokyo for analysis.

By conducting a questionnaire survey with the aforementioned four points in mind in the future, we will be able to understand the characteristics of community pharmacies that are implementing measures leading to the establishment of a regional medical collaboration system and to study what measures should be taken toward the establishment of this system.

## 5. Conclusion

This survey, to ascertain the status of initiatives leading to the establishment of a regional medical collaboration system in Tokyo and to understand the characteristics of community pharmacies that implement initiatives leading to the establishment of such a system, we analysed the responses obtained from the Tokyo Metropolitan Government in the community pharmacy functional information report and original item reports, and we studied measures to improve the construction of a regional

medical collaboration system in the future.

In summary, 629 community pharmacies, less than 10% of the 6,483 community pharmacies analysed, worked on all four of the items listed in a regional medical collaboration system in the community pharmacy functional information report. In contrast, the number of community pharmacies that are not currently working on any of these items was 2,534. In addition, the characteristics of community pharmacies that have established a regional medical collaboration system include a large number of pharmacists, medicine stockpiles, and efforts to improve the quality and ambition of pharmacists. Therefore, increasing the number of pharmacists working in community pharmacies and taking measures to improve the quality and aspirations of pharmacists may eventually trigger the establishment of a regional medical collaboration system.

## Conflict of Interest

There are no conflicts of interest to be disclosed.

## Acknowledgements

In conducting this survey, we would like to thank the Pharmaceutical Affairs Section, Health and Safety Division, Bureau of Public Health, Tokyo Metropolitan Government for providing information on responses to the community pharmacy functional information report and the Tokyo Metropolitan Government's independent published item report, which were the subject of the survey as of 1 November, 2020.

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