

**Figure 1** Demographic distribution of the workplaces of all JMS graduates in 1995. Filled circles, filled triangles, blank squares, blank circles and blank triangles represent hospitals, clinics, governmental offices, including public health centers, medical schools and others, respectively. The divided part of the left upper corner shows the major islands remote from the mainland. The figure was reproduced and modified from JMS material, entitled 'Current Status of JMS graduates'.

student:population ratio is higher in prefectures with a lower population. As a result, JMS has tended to recruit more high school students from the less populated prefectures of Japan. For example, Tottori-ken, the smallest populated prefecture, had 620,000 people, whereas Kyoto-hu, the average populated prefecture, had 2,600,000 people in 1992. JMS supplied almost the same numbers of graduates to both prefectures until 1992 (31 graduates to Tottori-ken and 33 graduates to Kyoto-hu).

It has been shown that medical schools located outside urban areas are more likely to succeed in recruiting graduates to rural areas (Roserblott *et al.* 1992; Magnus & Tollan 1993). JMS was established in a country region to meet this condition. Accordingly, the students of JMS are more likely to have experienced country life, compared with those of most medical schools located in urban or metropolitan areas. It has also been reported that primary care doctors move significantly shorter distances from their residencies than those from the other specialties (Dorner *et al.* 1991). As the graduates

return to their home prefecture on graduation, it is likely that they will continue to work in the same prefecture.

There have been some problems that need to be resolved if JMS is to develop further. First, there has been no standard nationwide postgraduate training available for general practitioners or family doctors. For this reason, there have been some variations in the postgraduate education undertaken by JMS graduates in their home prefectures. This variation should be corrected to assure and maintain the quality of medical services provided by medical graduates throughout Japan. Second, some of the graduates who have completed the contracted 9-year employment have left the rural areas, while some have taken up educational appointments or are employed in JMS as faculty staff members. JMS expects its graduates to remain in rural areas as enthusiastic promoters of rural medicine and community health in each prefecture. To accomplish this goal, JMS needs to find more suitable appointments for them and provide support for their families in the areas of education and employment. Third, as the

graduates return to their home prefecture after graduation, it is difficult to draw upon this resource for personnel to serve as JMS staff members. More importantly, doctors who have experienced a rural medical practice are likely to serve as the optimum staff members in terms of motivating undergraduate students to work in a rural medical practice. Some practical policies and strategies for recruiting JMS graduates to serve as JMS staff members are needed.

It has not been possible to collect information on the activities of other Japanese medical schools in rural doctor recruitment because relevant data have not been published. Such absence of information might affect the objectivity of evaluation. However, there is no doubt that JMS has produced the most graduates working in rural areas among Japanese medical schools (Japan Association for Development of Community Medicine 1991). Moreover, the governors have been responsible for supplying a medical service to underserved areas. Naturally, JMS graduates have been supplied by the governors to rural areas that are lacking doctors.

JMS graduates have been participating in community medicine in rural areas all over Japan for more than 20 years. Nine years of rural assignment are obviously effective for establishing JMS graduates in rural areas in the long-term. Although improvements are needed as mentioned, the JMS recruiting system has demonstrated its efficacy and serves as a practical response to the shortage of rural doctors, which has been a global problem that has not yet been resolved.

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## 研究成果の刊行に関する一覧表

## 雑誌

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Airmail



# Japan's new postgraduate medical training system

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Japan's Ministry of Health and Labour has been drastically overhauling its postgraduate medical training, laying a new emphasis on primary care. Introduced under a new law in 2000, the revamped system will be mandatory for all new doctors from April 2004. All doctors are to be trained to appreciate the primary care concept, and acquire basic capabilities in the field (see Table 1).

## MEDICAL TRAINING IN JAPAN BEFORE 2004

Since 1969, medical school graduates in Japan have been able to take a National Licence examination immediately after graduation, and then do clinical training in one of the 509 authorised teaching hospitals. Trainees usually train only in their own specialisation<sup>1</sup> and the quality and content of clinical training can be substantially different in each hospital.

### 1980 rotation system

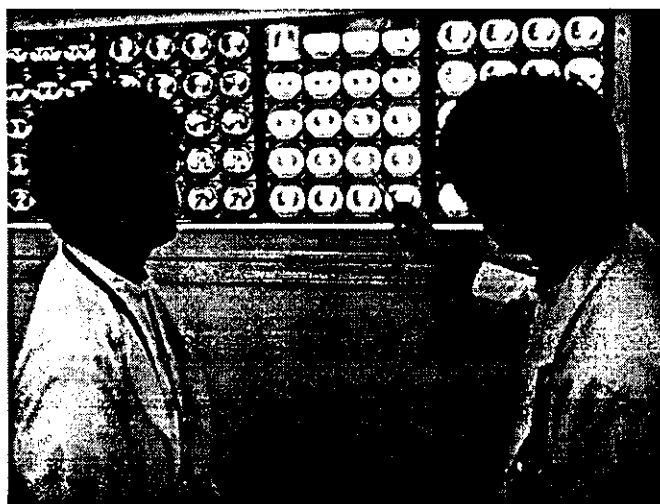
To try and redress the narrowly specialised training, the Ministry of Health and Labour introduced a system in 1980 under which trainees could rotate their work in some areas related to their future specialty – a trainee who hoped to

specialise in cardiology might also work in gastroenterology and pulmonology, for example.

### 1985 'super rotation' system

In 1985, the Ministry also introduced a 'super rotation' system, under which trainees could work

Issues of poor pay and working conditions became a social problem and a likely contributor to medical accidents



Students at Jichi Medical School.



Students at Jichi Medical School.

in a variety of fields regardless of their intended specialty. For those who hoped to specialise in primary care, however, there was no standard nationwide training programme of general practice and family medicine<sup>2</sup>, and most trainees still worked only in their chosen specialty or a few related areas<sup>3</sup>.

The failure to provide a mandatory postgraduate clinical training system caused the motivation of both trainees and teachers to deteriorate, while

issues of poor pay and working conditions became a social problem and a likely contributor to medical accidents.

#### NEW CLINICAL TRAINING AFTER 2004

To solve these problems, a new postgraduate training system was developed<sup>4</sup>; it was intended to:

- Implement a mandatory 'super rotation' system.
- Make all trainees rotate work in all relevant specialties.

- Improve trainees' salaries and working conditions.
- Improve the quality and quantity of teaching staff.

The training period is to be two years:

- In the first twelve months, all trainees must rotate work in internal medicine (at least six months), surgery and emergency medicine (including anaesthesiology).
- In the second twelve months, trainees will rotate work in paediatrics, OB-GYN, psychiatry and 'community health', for one month each. They can also take optional specialties within the training period.
- Part-time jobs outside the training hospital, which some trainees have held under the current system, will be forbidden but the trainees' salaries will be secured by law and financial support will be available for all teaching staff.

The 'community health' element is important, a one-month mandatory programme in which trainees are sent to primary care facilities such as community preventive health centres, commu-

**Table 1. Postgraduate medical education in Japan, 1969–2004**

Year	1969–2003	2004–
System	Not obligatory, regulated by the Law for Medical for Medical Doctors	Obligatory, regulated by the Revised Law for Medical Doctors
Content	Clinical training for at least two years after obtaining a Physician Licence	Clinical training for at least two years after obtaining a Physician Licence
Training	Monospecialty (46.5 per cent, 1995); some rotation training	Rotation training only
'Matching' scheme	No	Yes
Doctor licence	Necessary	Necessary
Training hospitals	509 (2002)	946 (2003)
Total national subsidy	4,300 million yen (2003)	17,100 million yen (2004 Budget)

nity clinics (preferably in rural and remote areas) and social welfare facilities outside the teaching hospital. Under the supervision of teaching staff, they will experience the practice of community-oriented primary care which should encourage them to become much-needed primary care professionals.

### THE 'MATCHING' SCHEME

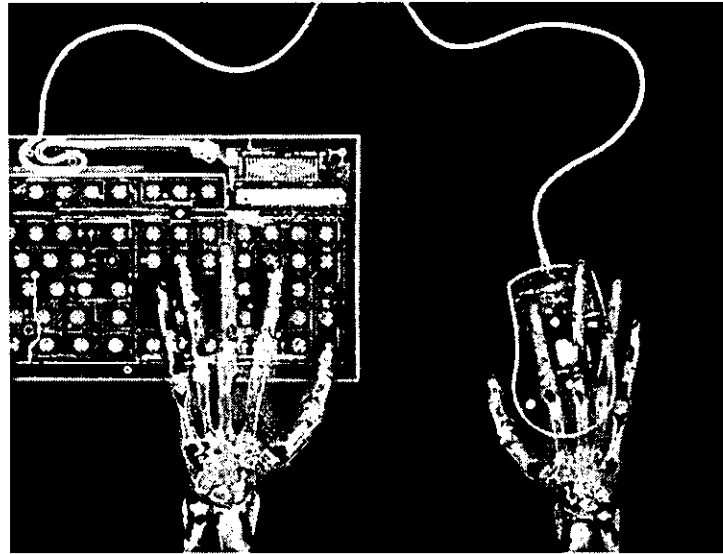
To prepare for the new system, a 'matching' scheme that mediates between trainees and teaching hospitals was introduced in 2003. Final-year medical students apply for places at several teaching hospitals: according to their preferences, available vacancies and interviews or examinations, a computer system determines who obtains a place, and where. This should help to

streamline the conventional application process which formerly took place on an individual-hospital basis, and prevent a concentration of graduates from the same medical school at their own university hospital. Graduates will now have more options, and this should be a strong incentive for training hospitals to improve the quality and quantity of their programmes and facilitate the expansion of primary care and generalisation in the Japanese medical education system as a whole.

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## Letter to the editor



# Japan's new postgraduate training system

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**E**ditor - In April 2004, a new postgraduate training system was introduced in Japan, requiring new doctors to undergo training for two years in specialties relevant to primary care.<sup>1</sup> Although this system is intended to facilitate the expansion of primary care, there is concern that it might lead to a shortage of doctors in some specialties. Under the new system, few doctors will be trained in specialties other than the designated ones, at least for the next two years. The new system will also lead to increased workloads for teaching staff in the designated specialties.

In the 1970s, to deal with a shortage of doctors and their uneven distribution across the country, the number of medical schools in Japan almost doubled. While this expansion eased the overall shortage of practitioners to some degree, the problem of geographical distribution remains.<sup>2</sup> When postgraduate training in primary care was limited,<sup>3</sup> the majority of doctors, trained at university or teaching hospitals, were reluctant to take on the care of patients outside their own specialties: a necessity in rural practice. In 2003, the media repeatedly publicised the fact that some community hospitals in rural areas were making

false claims to be employing doctors who in fact were not working there. These false claims were made to ensure that the hospitals continued to receive reimbursements: such hospitals would otherwise have received reduced payments, or would have had to cut the number of beds available. It is still enormously difficult to recruit full-time doctors to posts in rural areas.

So where have all the trained doctors gone over the past 20 years? Currently, the nationwide ratio is 2.0 doctors per 1,000 population (60% working in hospitals and 35% in clinics), with the ratio estimated to exceed 2.5

by 2025 – even raising concerns about a future surplus.<sup>4</sup> The ageing of Japanese society and advances in medical technologies has increased the demand for doctors. Also, the relatively high ratios of hospital beds to population in Japan, with more than 1.6 million beds for 127 million people (although the doctor/bed ratio is relatively small), together with decreased lengths of stay in hospital caused by payment reforms, requires a large physician workforce in hospitals. And increasing numbers of women are undertaking medical training (a

third of those currently in training are female), but the productivity of female doctors has been reported to be only 80–90% of that of male physicians.<sup>4</sup>

Policy regarding the training of doctors is a difficult task which needs constant monitoring and evaluation.<sup>5</sup>

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**Evaluation of a medical school for rural doctors**

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## **Abstract**

**Context.** Jichi Medical School (JMS) is the first and only medical school in Japan which was founded exclusively for producing rural doctors.

**Purpose.** To evaluate long-term effect of Jichi Medical School (JMS) on the nationwide distribution of doctors.

**Methods.** Data from the Japanese population census of 1995 and from the Japanese physician census of 1994 were combined for use in this study. Each municipality in Japan was categorized as rural or non-rural by one of four criteria: population, distance from a large city, altitude, and doctor/population ratio. We extracted the JMS graduates from the physician census and compared the distribution of JMS graduates to that of non-JMS graduates. Under the terms of the contract that students sign when they are admitted, JMS graduates have an obligation to work in rural areas for nine years after graduation. Therefore, we divided them into those who were 'under rural duty' or 'after rural duty.'

**Findings.** JMS graduates were more likely than non-JMS physicians to practice in rural municipalities. In 'small population' rural municipalities, there were 7.1 times more JMS graduates who were under rural duty and 4.6 times more JMS graduates after rural duty than non-JMS graduates. The JMS graduates accounted for only 0.7 percent of all the physicians in Japan. However, they accounted for 4.1 percent of the physicians in 'small population' municipalities, and 2.9 percent of those in 'medically-underserved' municipalities.

**Conclusions.** JMS's means of producing rural doctors has made an impact on doctor distribution nationwide. JMS has developed one successful approach to ameliorating the shortage of rural physicians.

**Keywords;** Jichi Medical School, education, rural health, doctor distribution, recruitment

## **Introduction**

The lack of physicians in rural areas remains a worldwide issue and has been a serious problem in Japan.<sup>1</sup> To improve the supply of rural physicians, the Japanese government has experimented with many strategies. The Strategy to Promote Rural Health and Medical Service has been in place since 1956, and includes the establishment of rural hospitals, clinics and health centers, transportation for patients, telemedicine services, financial aid for medical undergraduates who intend to practice in rural areas, mediation of physicians to rural practices and so on.<sup>2</sup> However, these measures did not contribute significantly to redressing the inequities between urban and rural areas.<sup>2,3</sup>

To solve this problem, Jichi Medical School (JMS) was established in 1972. Among the 80 medical schools in Japan, JMS is the only one that is dedicated exclusively to producing doctors for rural areas.<sup>4</sup> To encourage its graduates to practice in rural areas, JMS has a unique system that applies to

all of its students. Every year two or three high school graduates are recruited from each of Japan's 47 prefectures. Students are recruited from any municipality within the prefecture, but preferably from rural municipalities. The student recruiting program of JMS was described in a previous report.<sup>4</sup> All students are funded by their home prefectural governments so that they pay no tuition or school fees for their six years at the JMS. The six-year undergraduate program at JMS is tailored for future rural practice. There are lectures focusing on rural primary care: 10 credit hours in the first year, 15 in the third, 5 in the fifth, and 14 in the last year, most of which are given by experienced rural practitioners. In the fifth year, students spend two weeks in a rural practice in their home prefectures. In the sixth year they also can complete an elective rural internship for four weeks. In addition, the 'JMS prefecturers' union' of each prefecture invites JMS students to experience rural practice through summer internship programs.

All JMS graduates are required to take two years of postgraduate training at one of their home prefecture's general hospitals. Although mono-specialty training dominates Japanese postgraduate education, JMS graduates must complete rotations in internal medicine, surgery, and pediatrics. After the training, they have an obligation to work for seven years in the public clinics or hospitals in rural areas in their home prefecture. In Japan a rural area generally means a place that is remote and less populated. However, there is no clear definition of a rural area. So the areas to which JMS graduates are sent are determined by each prefectural office taking a demand-supply balance of the prefecture into account. After completing the nine years, the JMS graduates can choose to remain in rural practice or transfer to an urban one. However, each prefecture office has a responsibility to all under-obligation JMS graduates and to check the obligation fulfillment status of all the JMS graduates from the prefecture. Students who breach the obligation must pay all the medical school expenses at one time.<sup>4</sup>

This study evaluated the success of JMS in producing physicians in rural areas, and its impact on the nationwide distribution of doctors.

## **Methods**

Japan has three levels of government: municipal, prefectural, and national. Municipalities (cities, towns and villages) are the basic geographic units of administration. In 1994, there were 47 prefectures and 3,255 municipalities in Japan. The data of the Japanese nationwide population census of 1995 and the physician census of 1994, were combined according to the relevant municipal code numbers.<sup>5,6</sup> Under a legal obligation, both of the censuses must cover all of their subject populations. Since four municipalities merged into two in 1994 and 1995, we readjusted the numbers of physicians according to the 1995 boundaries.

In general, a rural community in Japan is located in the mountains, has a small population and is distant from large cities. In this study, therefore, each municipality in Japan was categorized as rural

or non-rural community according to one of the following four criteria:

1. the size of population = 20,000 or less
2. remoteness from the prefecture capital = 50 km or more
3. altitude of the community = 500m or more above sea level
4. the number of doctors per 100,000 residents = 50 or fewer.

Each category can overlap with another. We extracted JMS graduates from the 1994 physician census and classified them as 'under duty' or 'after duty' based on the status of their nine-year rural obligation. Because there are very few graduates of foreign medical schools in Japan, non-JMS physicians constituted virtually all of the graduates of the other 79 medical schools in Japan. By comparing the distribution of JMS graduates and non-JMS graduates in 1994, we evaluated the cumulative effect of JMS graduates on physicians' distribution in the entire nation since 1978 when JMS produced its first graduates.

To check the accuracy of the physician census data, the compliance rate of JMS graduates was examined. JMS reported that 1,748 graduates registered in National Doctor Registry between 1978 and 1994.<sup>7</sup> In the physician census for the same period, we found 1,661 JMS graduates. Subtracting the 24 graduates who were outside of Japan, 96 percent of the JMS graduate physicians were confirmed on the physician census data.

Because this study deals with the whole municipalities and almost all the physicians in Japan, we did not conduct any statistical tests.

## Results

Table 1 shows the characteristics of the four types of rural municipalities. The less populated and remote municipalities geographically occupy more than half of the country, but their populations comprise less than twenty percent of the national population. The physician/population ratios of all four types of rural municipalities were smaller than that of the nation as a whole. Table 2 shows the distribution of each physician group in the four types of rural municipalities. Both JMS graduates who were still under rural obligation and JMS graduates who have completed the rural duty were more likely than non-JMS physicians to practice in all four types of rural municipalities. Especially, in 'small population' rural municipalities, there were 7.1 times more 'under duty' JMS graduates and 4.6 times more 'after duty' JMS graduates than non-JMS graduates. With regard to those who were in at least one of the four categories, 2.7 times more were 'under duty' JMS graduates and 2.0 times more were 'after duty' JMS graduates. JMS graduates accounted for only 0.7 percent of all the physicians in Japan. However, they accounted for 4.1 percent of the physicians in 'small population' municipalities, and 2.9 percent of those in 'medically-underserved' municipalities. Only two percent of JMS graduates did not observe the rural practice obligation. The graduates were distributed throughout Japan, from Rishirito Island (Hokkaido) in the north, to Haterumato Island (Okinawa) in

the south.

As for specialties physicians have chosen, 67.7 percent of JMS graduates specialized in one of the primary care subjects which include internal medicine, surgery, and OB-GYN, while non-JMS graduates having chosen primary care subjects were 52.4 percent. Traditionally, there is no primary care specialty in Japan such as 'family medicine' or 'general practice' as in other countries.

## **Discussion**

JMS graduates are working in rural areas to a much greater percent than are graduates from other medical schools. When JMS was established, the general population and policy makers expressed two serious concerns about its plan to produce rural doctors.<sup>8</sup> The first was that JMS graduates would breach the contract with JMS and refuse to enter rural practices. By paying all the education fees, JMS graduates can dissolve the contract to work in rural areas. Contrary to the expectations, and as this study shows, the majority of JMS graduates have observed the contract. The second and graver concern was whether or not JMS graduates would remain in the rural areas after completing their contractual obligation. In this study, however, JMS graduates who had completed their obligatory work proved more likely to remain in rural communities than are other medical school graduates, although in lesser numbers than of JMS graduates who were still under a contract to work.

There are some limitations in this study. We employed as many criteria as possible to define rural and non-rural, and analyzed physicians' distribution. Though our definitions represent 'rurality' well, it is possible that rural municipalities, as defined by one of the four definitions, are not actually rural places, for example, lightly populated areas near a city. Matsumoto et al. used other definitions of rural municipalities by citing the size of its elderly population, economic power, and the rate of population decrease.<sup>9</sup> Lack of a clear quantitative definition of a rural place makes it difficult for Japanese researchers to conduct rural health research whose results are comparable with each other. Another limitation is that the data of this study is ten years old because it is the only data available. In the past ten years, the basic structure of JMS system did not change at all and continued to produce about one hundred rural doctors every year. However, JMS is a relatively young medical school, and therefore the cumulative effect of JMS graduates on the distribution of doctors in the country must be greater. A follow-up study to evaluate JMS's long-term effect on the nation's distribution of doctors should be conducted.

There are several programs that are designed to persuade students and physicians to work in rural areas. Most of these programs claim to have contributed to recruiting physicians in rural areas. However, these programs were only parts of a medical school's larger educational agenda or elements of a postgraduate GP training program. Examples are undergraduate short-term rural internship programs,<sup>10</sup> rural practice experience in postgraduate training,<sup>11-14</sup> and loan-forgiveness programs for medical students.<sup>15</sup> There is a program at a medical school that recruits small numbers

of rural students of and encourages them to enter rural family practice.<sup>16,17</sup> This program had remarkable success in having a high percentage of its graduates return to rural communities, and showed a clear correlation between rural background of students and their future rural practice, something that we did not evaluate in this study.<sup>16,17</sup> However, the contributions of most of these programs to rural health care seem to be rather local and small scale, compared to the JMS program.

The National Health Service Corps (NHSC) is one of the largest scholarship programs in the United States. In the NHSC program, medical students are recruited through a system of scholarship and for each year of scholarship support they are obliged to spend one year working at medically-underserved areas after residency training. Though this program succeeded in increasing health care manpower in rural areas, the recruitment rate of the program's doctors in rural areas seems to be lower than that of the JMS system.<sup>15</sup>

The JMS rural doctor production system is conducted systematically, with financial support from every prefectural government. Its mission as a school for rural doctors penetrates the JMS education system: the initial recruitment of students, undergraduate education, postgraduate training in home prefecture, and the seven-year obligation of rural practice.<sup>2,4</sup> All of these are the necessary components and are systematically united in JMS rural doctor production scheme. Every year, about one hundred medical students graduate from JMS. As a result, as this study showed, JMS' cumulative effect of 16 years is both nationwide and substantial.

Other than educational factors mentioned above, there may be additional factors that affect the retention of JMS graduates in rural areas. A literature has pointed out that lack of familiarity with rural life and worry about the extensive clinical capability that is needed for rural practice were major reasons for preventing non-rural Japanese doctors from entering rural practice.<sup>18</sup> However, during the obligation period, JMS graduates can develop suitable clinical capability for rural practice as well as familiarity with the rural life style. This may affect the career choice of JMS graduates who have finished their rural obligation. The network of JMS graduates in each prefecture is also a non-negligible factor. Every prefecture has a 'JMS prefecturers' union' in which graduates under or after obligation exchange information and support each other. The union enables JMS graduates to have a mutual locum service and career support. Isolation of a doctor in a rural area is one of the greatest deterrents to a rural medical practice.<sup>19,20</sup> Therefore this union system can help to retain JMS graduates in rural areas.

The results of this study cannot apply to other countries without considering the system of rural practice in Japan. The relocation of doctors in Japan is generally easy because there are no legal limitations for doctors in choosing places to work for to open private practice. Thus, in rural areas, the turnover of doctors is considered to be much higher than in urban or suburban areas.<sup>2</sup> Lobbying of rural politicians was active, and political pressure by rural people upon central government to secure health care was fierce. This background led policy makers to believe in the need to attach a

service obligation to any program to train rural doctors. This was the major reason for the JMS' foundation in 1972.

However, rural practice differs from country to country. In some countries a JMS-style nine year 'rural duty' might not be accepted at all from the perspective of the individual's right and freedom to choose a place in which to live and work.

In summary, this paper showed that Jichi Medical School, a medium size medical school which was founded exclusively for producing rural doctors, has been successful in increasing rural doctors. The effort of a single medical school, however, cannot solve the uneven distribution of physicians nationwide. Now more than thirty years since its foundation, the JMS model may serve as a reference for other medical schools which have the responsibility to remedy the shortage of doctors in rural areas. A systematic and comprehensive system for producing rural doctors is needed for these medical schools. Some medical schools in Japan actually are planning to incorporate a part of JMS system into their student recruitment or undergraduate education programs in order to produce rural doctors in their regions.<sup>21</sup> Each medical school's success in producing rural doctors will lead to the solution of this national problem.

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