health care to efficiently provide medical services overall.

4.2. Relationship between main area of practice and board-certified specialty

From our study, we found that the number of board-certified specialist and the number of those placed in the "main area of practice" categories were in general agreement, with some exceptions. Therefore, "main area of practice" can serve as effective lead indicators to help us better understand the career orientations of Japanese physicians.

Some specialties exhibited a difference between main area of practice and board-certified specialization. The difference in internal medicine (i.e. the number of "board-certified specialists" was less than that of physicians whose main area of practice was internal medicine) can be explained by the fact that the specialist system of general internal medicine is in the process of changing the definition of "specialist" to encompass the changes in the term made in 2008. A difference was also observed in allergology—the number of physicians whose main area of practice is allergology is more than that of "board-certified specialists". This observation may be due to the fact that the number of allergology specialists includes otorhinolaryngologists (allergic rhinitis), dermatologist (atopic dermatitis), and respiratory medicine specialists (asthma). A similar difference was seen in rheumatology and may be because rheumatology specialists include many of the orthopedic specialists.

This discrepancy has arisen as a result of the certification system of specialists. With regard to allergology, to become a board-certified allergologist, it is prerequisite to first be board certified in an area of medicine such as an internist, otorhinolaryngologist, dermatologist, or ophthalmologist. Therefore, those who are certified as allergologists are board certified in at least two areas, whereas, they can designate only one "primary main area of practice" in the survey. It is inferred that most board-certified physicians were likely to designate specialties other than allergology. In the Physician Survey data collected in 2006 on multiple practicing areas [24], on average, physicians responded that they were engaged in 1.64 areas of practice (those working at hospital 1.26, those working for clinics 2.32). These data indicate that many physicians, especially those who work for clinics, were involved in multiple practice areas, or even had multiple board certifications.

4.3. Japanese physicians career path and specialty certification

Our results showed that in Japan, younger physicians demonstrated an increased tendency toward specialization. Furthermore, physicians involved in internal medicine slowly tended to become specialized in particular subspecialties, typically taking about 4 years, and remained in those specialties subsequently. Surgeons, in general, tended to identify themselves from a very early stage of their career path as specialists in certain field. Some of surgeons switch their area of practice from surgery to internal medicine.

A variety of studies have been conducted on when and how physicians decide on their specializations. In a study in 1989 of Canadian medical school graduates, 12.5% were found to have changed their specialty choice after starting training [25]. Research conducted in Australia revealed that 50% of physicians decided their career path after the pre-registration year. A study in the United States found that, contrary to the earlier belief that changes between departments rarely take place [26], physicians did not necessarily stay in their initially chosen departments. This study showed that 9% of board-certified internal medicine physicians in the United States left internal medicine after 14–16 years of practice (4% for specialized internal medicine physicians and 21% for general internal medicine physicians) [27].

In terms of the quality of medical services provided by specialists, one study supported an association between board certification status and positive clinical outcomes [28], while another revealed mixed clinical outcome [29]. Continuous and further development of the specialist system is expected. In the United States, the duration of certification was changed from lifetime (indefinite) certification to time-limited certification, with the advent of the Maintenance of Certification process [30]. Time-limited certification was first adopted by the American Board of Family Practice in 1970.

Findings from other countries have indicated that it may also be necessary to expand the role of the Japanese Board of Medical Specialties, focusing on issues of coordination and standardization of the certification of qualifications, including the duration of the certification period and the conditions for renewal for specialist physicians, as well as the maintenance of medical service quality provided by specialist physicians. It will be difficult to drastically change the Japanese specialist system, as existing individual academic societies have been gradually developed over a long period of time, and Medical Law allows physicians to practice in any area regardless of their board certification. Steps are therefore required to ensure the consistency of certification standards among all participating academic societies, and to define layers of specialty categories (general specialties and subspecialties). These steps constitute a practical approach, and may be effective in consolidating already established specialist systems in an environment where the discretionary specialist system is already functioning. Thus, lessons from the case in Japanese could be applied in other countries in the future.

4.4. Limitations

Several limitations of our study should be considered in the interpretation of the current findings. First, although the National Physicians Survey was designed as a census survey, some physicians remain unreported. If such data are unevenly distributed, they may constitute unpredicted confounding factors. Second, because the single main area of practice data was only available after the 1994 survey, our study period for follow-up observations was relatively short. This approach would be sound if the career pattern

of physicians was quite stable. However, the increase in the proportion of female physicians, changes in medical school enrollment capacity, and recent changes to the postgraduate clinical training system might affect the career path patterns of physicians in Japan. As such, it remains unclear whether the women in the study sample were disproportionately over-represented in the younger generations of physicians, and, if so, whether the observed generational differences might have reflected, to some extent, gender differences rather than age differences alone. Third, the main area of practice and the board-certified specialization data were collected at different times, and are not identical indices. As these data do not have a one-to-one correspondence, this issue remains a potentially valuable area for future studies, including additional research combining data from individual physicians' main area of practice and board certification status.

However, despite these limitations, the National Physicians Survey is an extremely rich data source, so analyses of this database constitute the best available basis for discussing physicians' career paths in terms of specialization.

5. Conclusions

We analyzed the status of specialization and career paths, focusing primarily on physicians' main areas of specialization, using data collected between 1996 and 2006 in the National Survey of Physicians.

We found that in Japan, younger physicians showed a stronger tendency to become specialists. Among the physicians involved in internal medicine, the number continuing their engagement in internal medicine fell from 82.5% to 43.6% in their first 4 years of practice, then to 37.0% after 10 years, gradually becoming more specialized. Furthermore, surgeons, excluding chest surgeons and cardiovascular surgeons, typically chose their subspecialties in early stages of their careers, with only 9.1–16.8% of surgeons switching from surgery to internal medicine over 10 years.

We observed a trend toward medical specialization. However, to strengthen our medical system, we propose that increasing the number of physicians specializing in general practice and strengthening the certification system for (and maintaining the quality of) specialist physicians are important policy issues.

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