

11361	秩父郡横瀬町	5
11362	秩父郡皆野町	11
11363	秩父郡長瀬町	8
11365	秩父郡小鹿野町	15
11369	秩父郡東秩父村	1
11381	児玉郡美里町	6
11383	児玉郡神川町	7
11385	児玉郡上里町	16
11408	大里郡寄居町	33
11442	南埼玉郡宮代町	15
11445	南埼玉郡白岡町	61
11464	北葛飾郡杉戸町	45
11465	北葛飾郡松伏町	27
12101	千葉市中央区	1,361
12102	千葉市花見川区	157
12103	千葉市稲毛区	210
12104	千葉市若葉区	199
12105	千葉市緑区	202
12106	千葉市美浜区	261
12202	銚子市	82
12203	市川市	638
12204	船橋市	786
12205	館山市	105
12206	木更津市	255
12207	松戸市	696
12208	野田市	172
12210	茂原市	124
12211	成田市	250
12212	佐倉市	297
12213	東金市	70
12215	旭市	270
12216	習志野市	253
12217	柏市	802
12218	勝浦市	31
12219	市原市	504
12220	流山市	170
12221	八千代市	298
12222	我孫子市	137
12223	鴨川市	328
12224	鎌ヶ谷市	127
12225	君津市	70
12226	富津市	33
12227	浦安市	396
12228	四街道市	94
12229	袖ヶ浦市	52
12230	八街市	49
12231	印西市	29

27117	大阪市旭区	161
27118	大阪市城東区	392
27119	大阪市阿倍野区	885
27120	大阪市住吉区	441
27121	大阪市東住吉区	267
27122	大阪市西成区	216
27123	大阪市淀川区	269
27124	大阪市鶴見区	121
27125	大阪市住之江区	226
27126	大阪市平野区	276
27127	大阪市北区	1,083
27128	大阪市中央区	757
27141	堺市堺区	469
27142	堺市中区	236
27143	堺市東区	88
27144	堺市西区	175
27145	堺市南区	224
27146	堺市北区	357
27147	堺市美原区	31
27202	岸和田市	386
27203	豊中市	768
27204	池田市	248
27205	吹田市	2,058
27206	泉大津市	146
27207	高槻市	1,184
27208	貝塚市	151
27209	守口市	658
27210	枚方市	960
27211	茨木市	434
27212	八尾市	470
27213	泉佐野市	250
27214	富田林市	229
27215	寝屋川市	313
27216	河内長野市	240
27217	松原市	227
27218	大東市	176
27219	和泉市	419
27220	箕面市	259
27221	柏原市	106
27222	羽曳野市	235
27223	門真市	202
27224	摂津市	82
27225	高石市	103
27226	藤井寺市	116
27227	東大阪市	861
27228	泉南市	81
27229	四條畷市	109

46533	大島郡和泊町	9
46534	大島郡知名町	9
46535	大島郡与論町	5
47201	那覇市	614
47205	宜野湾市	90
47207	石垣市	82
47208	浦添市	243
47209	名護市	166
47210	糸満市	88
47211	沖縄市	355
47212	豊見城市	238
47213	うるま市	214
47214	宮古島市	91
47215	南城市	19
47301	国頭郡国頭村	2
47302	国頭郡大宜味村	1
47303	国頭郡東村	1
47306	国頭郡今帰仁村	5
47308	国頭郡本部町	18
47311	国頭郡恩納村	1
47313	国頭郡宜野座村	4
47314	国頭郡金武町	15
47315	国頭郡伊江村	2
47324	中頭郡読谷村	10
47325	中頭郡嘉手納町	11
47326	中頭郡北谷町	20
47327	中頭郡北中城村	18
47328	中頭郡中城村	67
47329	中頭郡西原町	384
47348	島尻郡与那原町	33
47350	島尻郡南風原町	247
47353	島尻郡渡嘉敷村	1
47354	島尻郡座間味村	2
47355	島尻郡粟国村	1
47356	島尻郡渡名喜村	1
47357	島尻郡南大東村	1
47358	島尻郡北大東村	1
47359	島尻郡伊平屋村	1
47360	島尻郡伊是名村	1
47361	島尻郡久米島町	11
47362	島尻郡八重瀬町	48
47375	宮古郡多良間村	1
47381	八重山郡竹富町	6
47382	八重山郡与那国町	1

多相生命表の原理を用いた診療科別医師数の将来推計に関する研究

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研究要旨

【目的】本研究では、現状の医学部定員が維持された場合の診療科ごとの医師数の将来推計を行うことを目的とした。

【方法】連続する2回の三師調査のデータを用いて、診療科群ごとに多相生命表の原理（図1）を用いて医師数の将来推計を行った。本研究では、2004年から2006年の変化と、2006年から2008年の変化を元に推計を行い、二つの変化を元に推計を行い比較した。比較を行うことにより、両結果に共通する大きな傾向を導き出した。また、診療科ごとの医師の将来推計を行ったのちに、総人口の将来推計をもとに、人口10万人当たりの医師数を求めた。

【結果】総医師数は今後も増加し続けるとの推計が得られた。人口10万人あたりでも、医師数は今後とも増加し、今後10年で15%程度増加すると推計が得られた。

【考察】1970年代の新設医大設立によりの医学部定員の大幅増があった。現在は、この増加後の定員にしたがった医師数が供給されており、増加前の定員に従った医師数が退職している。この差により、今後しばらくは医師の数は増加し続けると考えられる。

A. 研究目的

医師の供給と分布に影響を及ぼす二つの要因の大きな変化として、医学部定員の増加と女性医師の割合の増加が近年起こっている。本研究では、現状の医学部定員が維持された場合の診療科ごとの医師数の将来推計を行うことを目的とした。

B. 研究方法

医師・歯科医師・薬剤師調査（以下「三師調査」）に係る調査票情報の提供を統計法に基づき申請、許可を得てデータ分析を行った。

連続する2回の三師調査のデータを用いて、診療科群ごとに多相生命表の原理（図1）を用いて医師数の将来推計を行った。さらに、本研究では、2004年から2006年の変化と、2006年から2008年の変化の二つの変化を元に推計を行い、二つの変化を元に推計を行い比較した。比較を行うことにより、両結果に共通する大きな傾向を導き出した。

診療科群は、三師調査の主たる診療科の選択肢を、表1と表2に従って分類した。2006年と2008年で、診療科の選択肢に変更があり、2008年に消化器外科が新設された。このため、2006年に消化器科と回答し、2008年に消化器外科と回答

している医師を 2006 年においても消化器外科であったが、選択肢がないために消化器科と回答したとみなし、外科に所属していたとみなした。また、主たる診療科を記入していない「無記入」の医師を、2004 年から 2006 年の推計では、「その他」に分類したが、2006 年から 2008 年の推計では診療している医師の推計の精度を高めるために、「無届」に分類し、総医師数としてカウントしないようにした。

将来推計における新規医籍登録者数は、医学部定員を 6 年後にスライドし、合格率を 7313/7630 (2000 年入学) とし、推定した。入学定員は、平成 19 年度まで 7625 人、平成 20 年度は 7793 人、平成 21 年度以降は 8486 人とした。

診療科ごとの医師の将来推計を行ったのちに、国立社会保障・人口問題研究所による総人口の中位将来推計をもとに、人口 10 万人当たりの医師数を求めた。2004 年から 2006 年の変化をもとに推計を行った結果と 2006 年から 2008 年の変化をもとに推計を行った結果との比較を行った。

C. 研究結果

図 2 に総医師数の将来推計を示す。総医師数は今後も増加し続けるとの推計が得られた。表 3、4 に人口 10 万人当たりの医師数を示す。人口 10 万人あたりでも、医師数は今後とも増加し、今後 10 年で 15% 程度増加するとの推計が得られた。図 3 に内科医師数の将来推計、図 4 に小児科医師数の将来推計を示す。内科と小児科は、2004-2006 の変化を元にした推計と、2006-2008 の変化を元にした推計

で大きな変化はなく、増加する傾向を示していた。図 5 に外科医師数の将来推計、図 6 に産婦人科医師の将来推計を示す。外科・産婦人科では、2004-2006 の変化を元にした推計と、2006-2008 の変化を元にした推計では、推計開始時点の人数が異なっているものの、直近では若干減少し、その後増加に転ずるような傾向を示していた。図 7 に精神科医師数の将来推計を示す。精神科は、2004-2006 の変化を元にした推計で、上昇する傾向を示していたが、2006-2008 の変化を元にした推計では、さらに上昇する傾向を示した。

D. 考察

今後とも将来の医師数は増加し続けるとの結果が得られた。1970 年代の新設医大設立によりの医学部定員の大幅増があった。現在は、この増加後の定員にしたがった医師数が供給されており、増加前の定員に従った医師数が退職している。この差により、今後しばらくは医師の数は増加し続ける。しかし診療科別にみると、医師の診療科選択の変化の影響で、外科、産婦人科など、若い医師によって選択割合の低い診療科では、医師数の低下が見込まれる。

本研究では、診療科別の医師数の将来推計を行った。2006 年から 2008 年では、診療科の選択肢が変更され、外科・内科に分割された診療科があり、分割後の 2008 年から 2006 年の分類の推定を行っている。多くの医師は自身の診療科を変更することは少なく、主たる傾向をとらえられているが、何人かは、無届などにより、本来の分類と異なる部分が存在す

ると考えられる。なお、総医師数が2004-2006 の変化を元にした推計よりも2006-2008 の変化を元にした推計の方が少ないのは、2006-2008 の変化を元にした推計では診療している医師の推計の精度を高めるために、「未記入」の扱いを変更したことが原因と考えられる。また、医師数の将来推計を実施したが、医師の供給の問題を考える場合には、供給の側面だけではなく、需要の側面も必要である。本研究では簡易的に、人口10万人当たりの医師数を用いた。この推計には将来の人口推計の精度が問題となる。また、人口分布の変化による必要とする医療の量の変化や、医療の高度化に伴う必要とする医師の数の増加も考慮に入れることにより精度の高い需給関係を推測することが可能である。

G. 知的財産権の出願・登録状況

なし

E. 結論

今後も総医師数は増加し続ける。診療科別では、減少をする診療科も存在するが、増加に転じるものと考えられる。

F. 研究発表

1. 論文発表

なし

2. 学会発表

松本伸哉、小池創一、児玉知子、井出博生、今村知明. 医師数の将来推計に関する一考察. 第69回日本公衆衛生学会総会, 東京、2010.10

図1 多相生命表の原理を用いた医師の将来推計の原理について

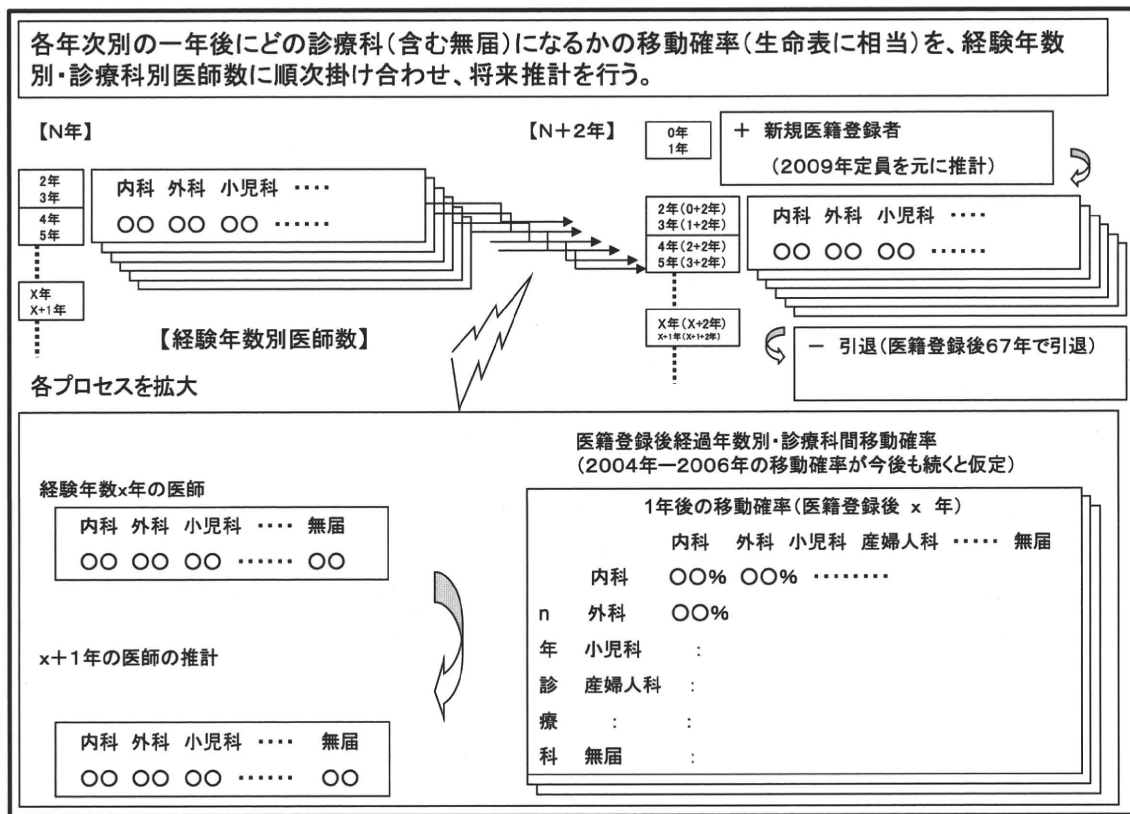


図2 総医師数将来推計

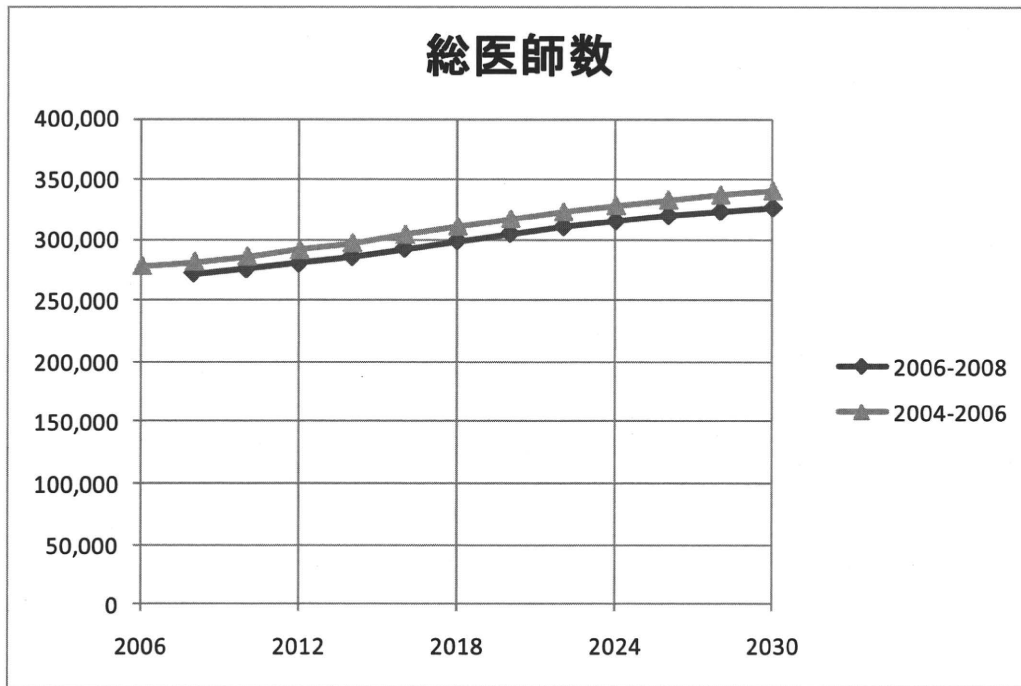


图3 内科医师数将来推計

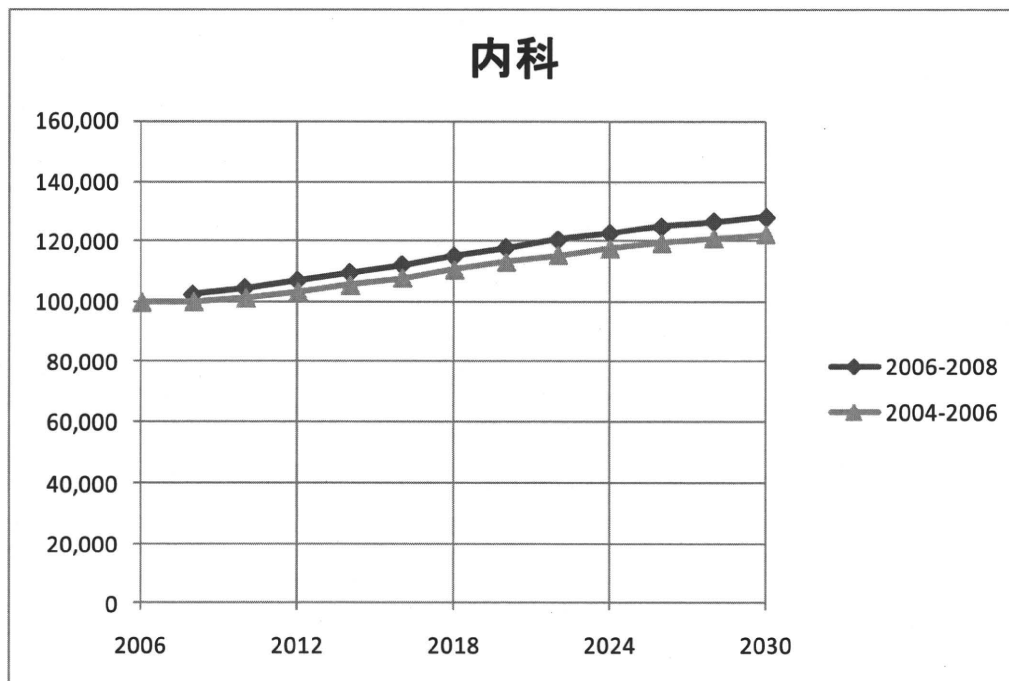


图4 小児科医师数将来推計

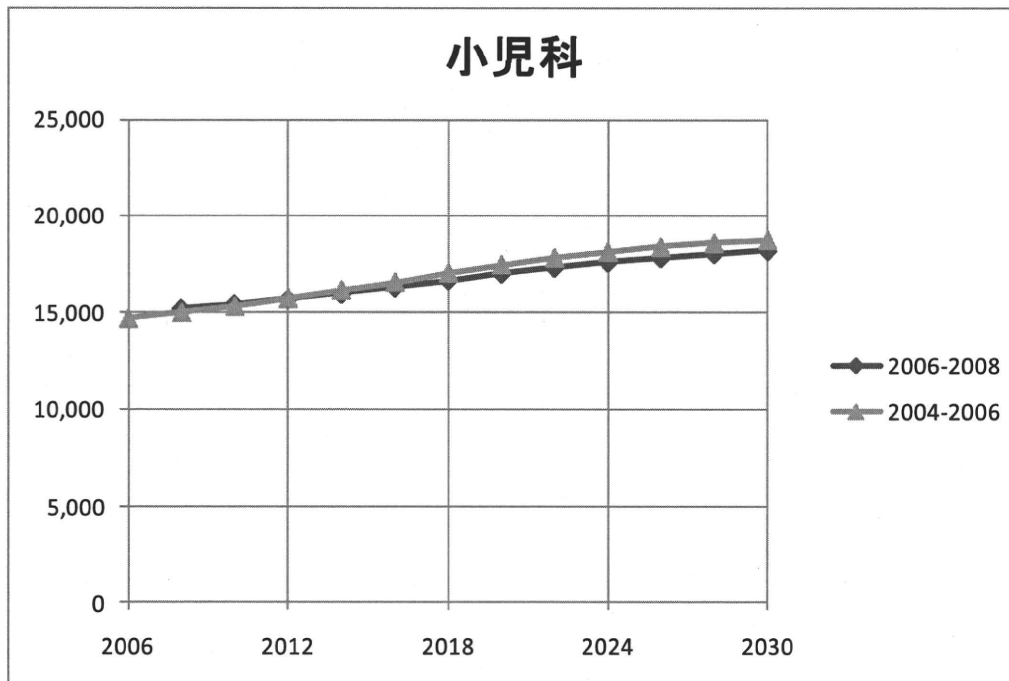


図5 外科医師数将来推計

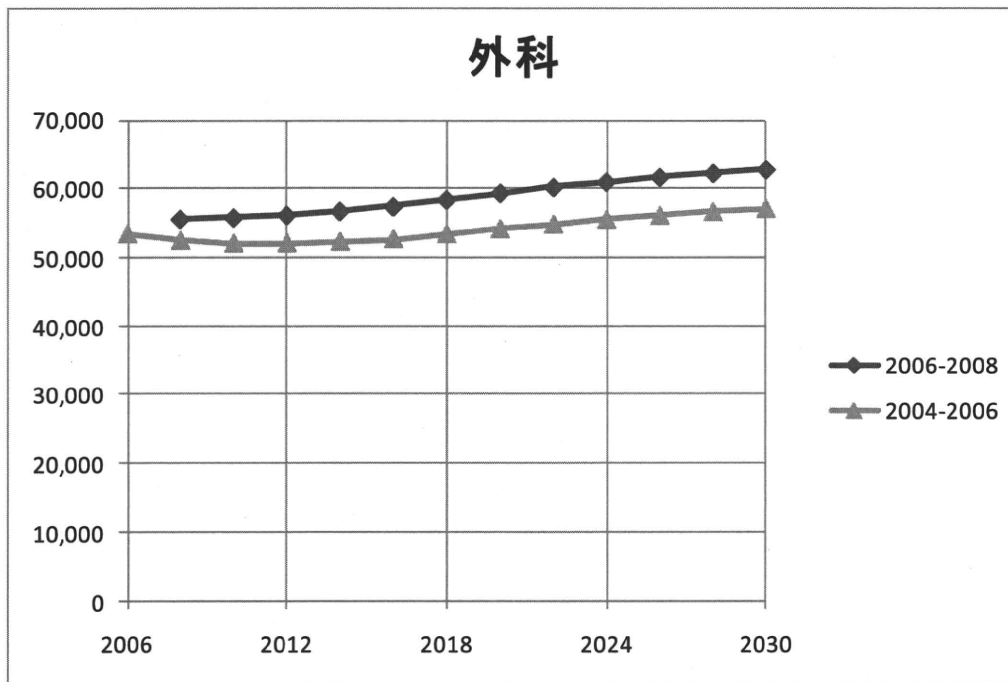


図6 産婦人科医師数将来推計

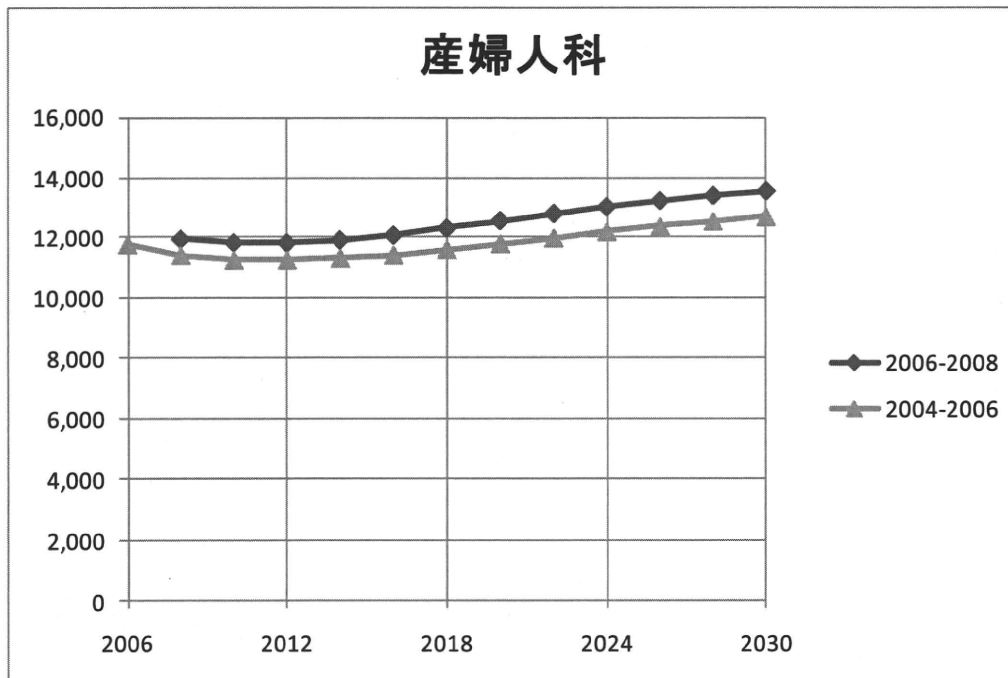


図7 精神科医師数将来推計

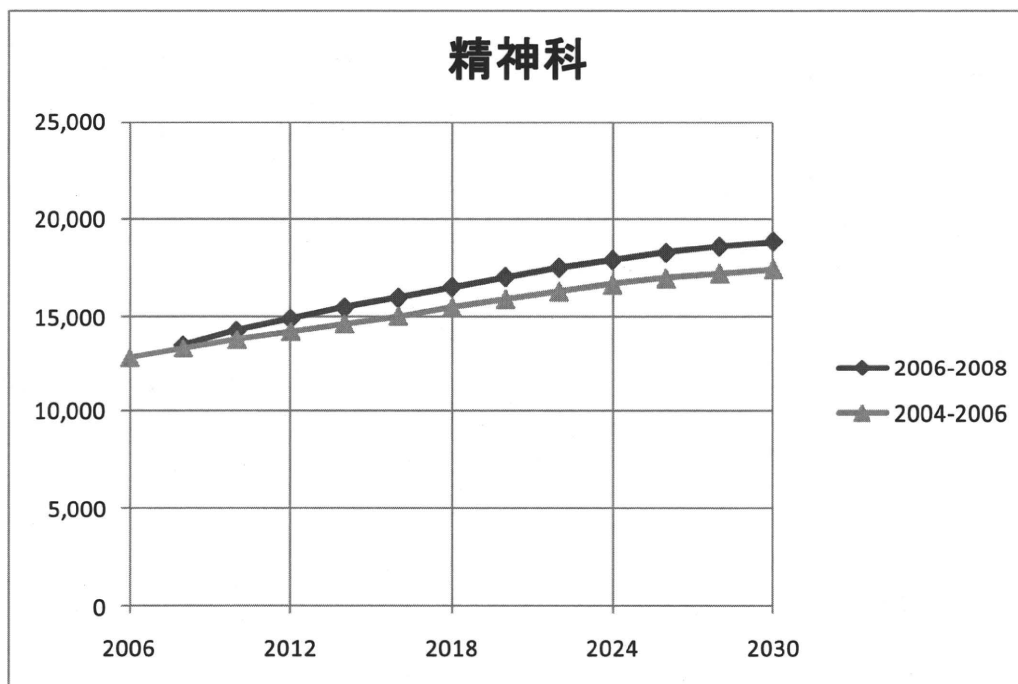


図8 その他医師数将来推計

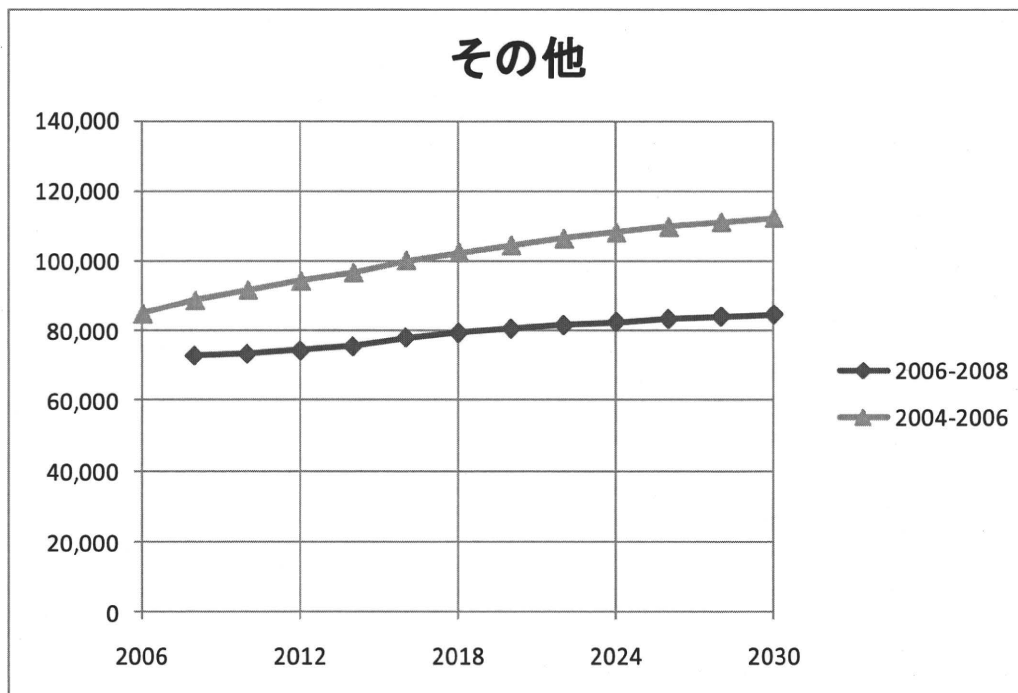


表1 2004年—2006年推計における診療科分類

診療科分類	主たる診療科
内科	アレルギー科、リウマチ科、呼吸器科、循環器科、消化器科、心療内科、神経内科、内科
小児科	小児科
精神科	神経科、精神科
外科	外科、形成外科、呼吸器外科、小児外科、心臓血管外科、整形外科、脳神経外科、美容外科
産婦人科	産科、産婦人科、婦人科
その他	その他、無記入、リハビリテーション科、眼科、気管食道科、耳鼻咽喉科、性病科、全科、泌尿器科、皮膚科、放射線科、麻酔科、肛門科、

表2－(a) 2006年－2008年推計における2006年の診療科分類

診療科分類	主たる診療科
内科	アレルギー科、リウマチ科、呼吸器科、循環器科、消化器科（胃腸科）、心療内科、神経内科、内科
小児科	小児科
精神科	神経科、精神科
外科	こう門科、外科、気管食道科、形成外科、呼吸器外科、小児外科、心臓血管外科、整形外科、脳神経外科、美容外科
産婦人科	産科、産婦人科、婦人科
その他	その他、ひ尿器科、リハビリテーション科、眼科、救命救急、研修医、耳鼻いんこう科、主たる診療科名不詳、診療科名不詳、性病科、全科、皮膚科、病理、放射線科、麻酔科
無届	回答なし

表2－(b) 2006年－2008年推計における2008年診療科分類

診療科分類	主たる診療科
内科	アレルギー科、リウマチ科、感染症内科、血液内科、呼吸器内科、循環器内科、消化器内科（胃腸内科）、心療内科、神経内科、腎臓内科、糖尿病内科（代謝内科）、内科
小児科	小児科
精神科	精神科
	外科、気管食道外科、形成外科、呼吸器外科、循環器外科（心臓・血管外科）、小児外科、消化器外科（胃腸外科）、整形外科、乳腺外科、脳神経外科、美容外科、肛門外科
産婦人科	産科、産婦人科、婦人科
その他	その他、リハビリテーション科、眼科、救急科、耳鼻いんこう科、主たる診療科名不詳、診療科名不詳、全科、泌尿器科、皮膚科、病理診断科、放射線科、麻酔科、臨床検査科、臨床研修医
無届	回答なし

表3 2004年-2006年の変化を元にした将来推計 医師数(人口10万人当たり医師数)

	全医師	内科	小児科	精神科	外科	産婦人科	その他
2006	217.3	78.1	11.5	10.0	41.9	9.2	66.6
2008	220.3	78.3	11.8	10.5	41.2	8.9	69.7
2010	224.5	79.5	12.0	10.9	41.0	8.8	72.3
2012	229.7	81.4	12.4	11.3	41.2	8.9	74.6
2014	235.7	83.7	12.8	11.6	41.6	9.0	76.9
2016	243.1	86.2	13.2	12.0	42.2	9.1	80.2
2018	250.6	89.2	13.7	12.5	43.1	9.4	82.7
2020	258.2	92.1	14.2	13.0	44.1	9.6	85.1
2022	265.8	95.1	14.7	13.4	45.2	9.9	87.6
2024	273.5	98.0	15.1	13.9	46.3	10.2	90.1
2026	281.0	100.8	15.5	14.3	47.4	10.4	92.5
2028	288.4	103.5	15.9	14.7	48.5	10.7	95.0
2030	295.7	106.2	16.2	15.1	49.6	11.0	97.4

表4 2006年-2008年の変化を元にした将来推計 医師数(人口10万人当たり医師数)

	全医師	内科	小児科	精神科	外科	産婦人科	その他
2008	213.0	80.2	11.9	10.6	43.7	9.4	57.2
2010	216.5	82.1	12.1	11.2	44.0	9.3	57.8
2012	221.1	84.3	12.4	11.8	44.5	9.3	58.8
2014	226.7	87.0	12.7	12.3	45.2	9.5	60.1
2016	233.8	89.7	13.0	12.8	46.0	9.7	62.5
2018	240.9	92.9	13.4	13.3	47.2	9.9	64.1
2020	248.2	96.1	13.8	13.9	48.4	10.2	65.6
2022	255.4	99.4	14.2	14.4	49.7	10.5	67.2
2024	262.5	102.5	14.6	14.9	50.9	10.9	68.7
2026	269.5	105.6	15.0	15.4	52.1	11.2	70.3
2028	276.4	108.5	15.4	15.9	53.3	11.5	71.8
2030	283.2	111.4	15.8	16.3	54.5	11.8	73.4

研究成果の刊行に関する一覧表

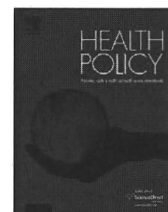
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Specialty choice and physicians' career paths in Japan: An analysis of National Physician Survey data from 1996 to 2006

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ABSTRACT

Objectives: To investigate trends of specialty distribution and physicians' career paths in Japan, and to discuss potential policy implications.

Methods: Distribution of main area of practice, relation between board-certified specialists and reported main area of practice, and migration of main area of practice by career stage were analyzed in data from the National Physician Survey, collected between 1996 and 2006.

Results: The percentages of physicians involved in internal medicine, surgery, neurosurgery, pediatrics, ophthalmology, obstetrics and gynecology and otorhinolaryngology decreased from 1996 to 2006. Overall, the numbers reported for the main area of practice matched the number of board-certified specialists. Among physicians who began their careers as internal medicine physicians in the 1996 registration cohort, the proportion of those engaged in internal medicine fell from 82.5% in 1996, to 43.6% in 2000, to 37.0% by their 10th year. Among five registration cohorts analyzed, 9.1–16.8% of the surgical specialties group switched their main area of practice to internal medicine within 10 years.

Conclusions: While there is a general trend toward specialization, it is important to balance between general practice and specialization to strengthen health care systems. Developing a certification system and maintaining the quality of specialist physicians are also crucial.

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1. Introduction

Establishing quality assurance systems for medical specialties as well as keeping an appropriate balance between generalists and specialists is an important health policy issue for improving and strengthening health care system. Analyzing the career paths of physicians in terms of when and how they decide on their specialties can provide useful insights.

In recent years, increasing numbers of physicians have chosen to specialize in their careers. This trend has been reported in the United States [1,2], United Kingdom [3,4] and Australia [5]. These trends brought the Council on Graduate Medical Education (COGME) in the United States to recommend that 50% of new physicians should enter a generalist discipline while 50% should specialize [6]. Many studies have been conducted to examine the determinants of specialty choice [7–10] and the specialist orientation and the reasons underlying the specialty choices of Japanese physicians [11–13].

The specialist certification system in Japan developed through the efforts of individual academic societies. In

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1962, the first certification system for physicians was established by the Japanese Society of Anesthesiologists. In subsequent years, other academic societies started their own specialist systems. At that time, different academic societies developed and operated different specialty certification systems relatively independently. A meeting of the academic societies that had already established specialist systems and those that were planning or considering implementing such systems was held in 1990 to discuss measures for enhancing and developing certification systems for specialization. Then a joint consortium authorized by the participating academic societies was established, which brought to the establishment of the Japanese Board of Medical Specialties.

The purpose of the present study is to investigate the status and trends of the distribution of medical specialties and physicians' career paths in Japan focusing on the main areas of practice, using data from the National Physicians Survey collected between 1996 and 2006. We examined when physicians chose their area of practice and whether career choice trends have changed in recent years. We discuss these findings in the context of their potential policy implications.

Although the importance of the issue of specialist qualifications is widely recognized, when and how physicians decide their specialties has not been analyzed in detail using the National Physicians Survey data. In this regard, our study is novel in terms of its scale as it aimed to analyze and evaluate the status of specialist orientation and of specialist physicians' career paths using data collected in census surveys conducted by the Japanese government in 1996–2006.

2. Materials and methods

In Japan, all physicians are required to report their status to the national government once every 2 years in compliance with the Medical Practitioners Law. We requested an official permission from the Ministry of Health, Labour and Welfare to analyze selected data items of the survey for the research purpose in accord with the procedure set forth in Statistics Law. The data items provided from the Ministry contained physicians' sex, age, registration number, main area of practice (not necessarily a board-certified specialty) and types of medical facilities in which they work (e.g. university hospital, other hospital or clinic). However, to protect the privacy of the respondents of the survey, we did not request that the Ministry disclose the names of physicians or medical facilities. Some of the main areas of practice were combined for our analysis (e.g. obstetrics, gynecology, obstetrics and gynecologists were collected in three different areas of practice in the survey, but are combined as "obstetrics and gynecology" in our study). The Ethical Guidelines for Epidemiological Studies published by Ministry of Education, Culture, Sports, Science and Technology and Ministry of Health, Labour and Welfare exempted observational studies based on existing materials from requiring individual informed consent. To avoid any potential or indirect violation of privacy, tabulated numbers less than five are masked in our tables.

We first compared the distribution of specialties between 1996 ($n=240,215$) and 2006 ($n=277,927$), separately by sex. To determine whether the main area of practice and board-certified specialty matches, we generated a scatter plot graph to compare board-certified specialists and the main areas of practice for available 25 fields, where the name of the board and main area of practice matches. In this analysis, "main area of practice" data were obtained from the National Physician Survey conducted at the end of December 2006. "Board-certified specialist" data were obtained from the Japanese Board of Medical Specialties data collected at the end of March, 2008 [14]. It should be noted that these data were collected independently and the data obtained at different time points. Individual physicians' data linkages between the two databases were not available.

We analyzed 2006 survey data to examine how main areas of practice were distributed among different generations. In this analysis, gastroenterology, cardiology, pulmonology, neurology, rheumatology, psychosomatic internal medicine and allergology were categorized as internal subspecialties. Neurosurgery, cardiovascular surgery, plastic surgery, chest surgery, pediatric surgery and aesthetic plastic surgery were categorized as surgical subspecialties. From the National Physician Survey collected data on the year of registration of each physician, we calculated the year since registration and categorized them into cohorts of 0–1 years (registration cohorts of 2005 and 2006), 2–9 years (between 1997 and 2004), 10–19 years (between 1987 and 1996), 20–29 years (between 1977 and 1986), 30–39 years (between 1967 and 1976), 40–49 years (between 1957 and 1966) and over 50 years (before 1956) since they had registered as physicians. Physicians with 0–1 years of experience were separately categorized, as a mandatory 2-year postgraduate medical training was introduced in 2004.

Finally, as a measure of migration from a main area of practice (i.e. a change from a relatively general practice such as internal medicine/surgery to specialty practice such as internal medicine subspecialties/surgical subspecialties or *vice versa*) in different physicians' career stages, internal medicine groups (internal medicine, and internal medicine subspecialties) and surgical specialties groups (surgery and subspecialties in surgery) as of 1996 year were followed up for 10 years until 2006. We analyzed data of five cohorts of 10-year intervals (1996, 1986, 1976, 1964, 1956 registration cohort) collected from 1996 to 2006, representing groups with 0–10, 10–20, 20–30, 30–40, and 40–50 years of experience in the observation period. We used the observation period between 1996 and 2006 as data on the main area of practice have only been available in the National Physicians Survey since 1994. Before 1992, all areas of practice were collected without identifying the main area of practice. Data analyzed for the internal medicine group were 1063 for the 1956 registration cohort, 1009 for the 1966 cohort, 1625 for the 1976 cohort, 2499 for the 1986 cohort and 2736 for the 1996 cohort were analyzed. The number of subjects we analyzed in the surgical groups was 324 for the 1956 cohort, 393 for the 1966 cohort, 655 for the 1976 cohort, 1175 for the 1986 cohort and 1142 for the 1996 cohort. Distribution of main area of practice in

Table 1
Distribution of main areas of practice in the 1996 and 2006 surveys.

	2006 survey						1996 survey			
	Total			Female			Total		Female	
	Number	%	(1)	Number	%	(2)	Number	%	Number	%
Internal medicine specialties group										
Internal medicine	70,470	25.4	**	10,496	14.9	**	72,485	30.2	8968	12.4
Gastroenterology	10,762	3.9	**	1127	10.5	**	8274	3.4	684	8.3
Cardiology	9416	3.4	**	909	9.7	**	6705	2.8	538	8.0
Pulmonology	3966	1.4	**	620	15.6	**	2717	1.1	306	11.3
Neurology	3443	1.2	**	675	19.6	**	2648	1.1	422	15.9
Rheumatology	760	0.3	**	146	19.2	**	353	0.1	44	12.5
Psychosomatic internal medicine	841	0.3	**	160	19.0	**	279	0.1	46	16.5
Allergology	184	0.1	*	36	19.6	*	120	0.0	16	13.3
Surgical specialties group										
Surgery	21,574	7.8	**	974	4.5	**	24,855	10.3	591	2.4
Neurosurgery	6241	2.2	*	236	3.8	**	5629	2.3	148	2.6
Cardiovascular surgery	2585	0.9	**	104	4.0	**	2016	0.8	37	1.8
Plastic surgery	1909	0.7	**	421	22.1	**	1303	0.5	195	15.0
Chest surgery	1255	0.5	**	61	4.9	*	743	0.3	19	2.6
Pediatric surgery	661	0.2	**	108	16.3	**	553	0.2	58	10.5
Aesthetic plastic surgery	394	0.1	**	47	11.9	*	156	0.1	9	5.8
Others										
Orthopedics	18,870	6.8	*	672	3.6	**	16,391	6.8	425	2.6
Pediatrics	14,700	5.3	**	4576	31.1	**	7387	5.7	3870	28.2
Psychiatry	12,829	4.6	**	2391	18.6	**	10,666	4.4	1624	15.2
Ophthalmology	12,362	4.4	*	4556	36.9	**	10,957	4.6	3989	36.4
Obstetrics and gynecology	11,783	4.2	**	2761	23.4	**	12,389	5.2	1894	15.3
Otorhinolaryngology	8909	3.2	**	1666	18.7	**	8806	3.7	1459	16.6
Dermatology	7845	2.8	**	3071	39.1	**	6776	2.8	2137	31.5
Anesthesiology	6209	2.2	**	1834	29.5	**	5037	2.1	1203	23.9
Urology	6133	2.2	**	214	3.5	**	5161	2.1	98	1.9
Radiology	4883	1.8	**	938	19.2	**	4178	1.7	648	15.5
Residents	14,402	5.2	**	4739	32.9	**				
Other	8720	3.1	**	1411	16.2	**	5335	2.2	683	12.8
Unknown, not in clinical practice	15,821	5.7	**	2935	18.6	**	11,946	5.0	1853	15.5
Total	277,927	100.0		47,884	17.2	**	240,215	100.0	31,964	13.3

(1) 2×2 chi-square test for respective specialties/all other specialties \times 1996/2006. (2) 2×2 chi-square test for male/female \times 1996/2006.

* $p < 0.05$.

** $p < 0.01$.

these cohorts was investigated to determine when and how physicians in the internal medicine groups and surgical groups had migrated into different areas of practice over the course of their careers.

Chi-square tests were used to analyze whether the proportion of female or specialty distribution significantly changed between 1996 and 2006. For these analyses, we considered $p < 0.05$ to indicate statistically significant differences. SPSS 16.0J (SPSS Japan, Inc., Tokyo, Japan) was used for statistical analysis.

3. Results

3.1. Distribution of main area of practice in 1996 and 2006

The distributions of the main areas of practice in 1996 and 2006 are shown in Table 1. In the 2006 survey, the following main areas of practice were highly represented (shown as a percentage of the total number of physicians): general internal medicine (25.4%), surgery (7.8%), orthopedics (6.8%), pediatrics (5.3%), psychiatry

(4.6%) and ophthalmology (4.4%). In the 1996 survey, internal medicine (30.2%), surgery (10.3%), orthopedics (8.6%), pediatrics (5.7%), obstetrics and gynecology (5.2%) and psychiatry (4.4%).

The areas of practice with over 30% of female physicians in 2006 were dermatology (39.1%), ophthalmology (36.9%), residents (32.9%) and pediatrics (31.1%). In 1996, they were ophthalmology (36.4%) and dermatology (31.5%). In terms of proportion of female in all physicians, we found significant increase over the study period (13.3–17.2% $p < 0.001$). Comparing the percentage of main area of practice in 1996 and 2006 revealed a significant decrease in the percentage in internal medicine (30.2–25.4%), surgery (10.3–7.8%), neurosurgery (2.3–2.2%), pediatrics (5.7–5.3%), ophthalmology (4.6–4.4%), obstetrics and gynecology (5.2–4.2%) and otorhinolaryngology (3.7–3.2%).

No data for “residents” in 1996 as it was only in 2004 that the 2-year postgraduate clinical training program became compulsory for all practicing physicians and so added resident as one of the area of practice in Physician Survey, in the 1996 survey data, medical residents indicated a department they were engaged in at the time of the survey.

Table 2
Distribution of main areas of practice as of 2006.

Years since registered as physician	Number	Internal medicine	Internal subspecialties	Surgery	Surgical subspecialties	Orthopedics	Pediatrics	Psychiatry	Obstetrics and gynecology	Others	Residents	Unknown, not in clinical practice	Total
0–1 years	193	1.34	31	44	14	12	22	24	10	169	13,851	81	14,451
	%		0.21	0.30	0.210	0.08	0.15	0.17	0.07	1.17	95.85	0.56	100.00
2–9 years	9575	17.3	8747	4378	3662	4085	3335	3165	2229	13,637	543	1967	55,323
	%		15.8	7.9	6.6	7.4	61.0	5.7	4.0	24.6	1.0	3.6	100.0
10–19 years	16,368	22.8	9499	6135	4342	5671	3344	3668	2763	16,858	6	3176	71,830
	%		13.2	8.5	6.0	7.9	4.7	5.1	3.8	23.5	0.0	4.4	100.0
20–29 years	18,180	28.8	6647	4871	3281	4619	3857	2842	2623	12,925	1	3194	63,040
	%		10.5	7.7	5.2	7.3	6.1	4.5	4.2	20.5	0.0	5.1	100.0
30–39 years	11,295	32.1	3020	3141	1365	2311	2311	1472	1868	5944	0	2305	35,182
	%		8.6	8.9	3.9	7.0	6.6	4.2	5.3	16.9	0.0	6.6	100.0
40–49 years	7038	35.1	953	1770	304	1432	975	1040	1198	3214	0	2127	20,051
	%		4.8	8.8	1.5	7.1	4.9	5.2	6.0	16.0	0.0	10.6	100.0
Over 50 years	7821	43.3	475	1235	77	590	856	618	1092	2314	1	2971	18,050
	%		2.6	6.8	0.4	3.3	4.7	3.4	6.0	12.8	0.0	16.5	100.0
Total	70,470	25.4	29,372	21,574	13,045	18,870	14,700	12,829	11,783	55,061	14,402	15,821	277,927
	%		10.6	7.8	4.7	6.8	5.3	4.6	4.2	19.8	5.2	5.7	100.0

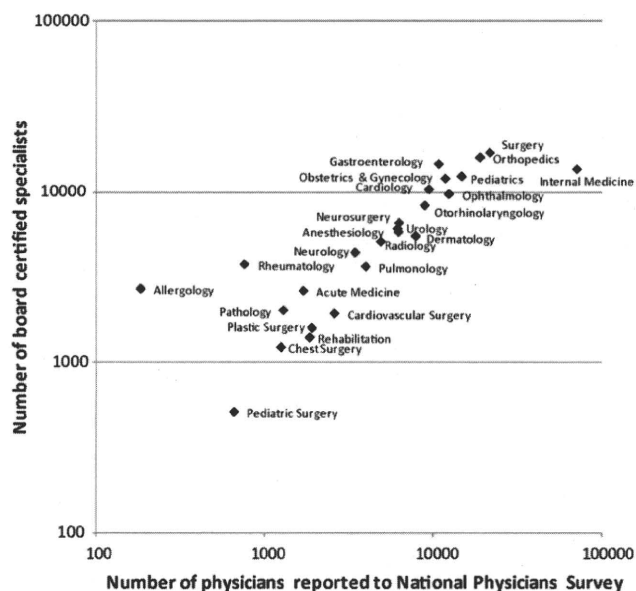


Fig. 1. Main areas of practice obtained from National Physician Survey and the number of board-certified specialists obtained from Japanese Board of Medical Specialties

3.2. Main area of practice and board-certified specialists

The scatter plot graphs revealed that data points for most of the specialized fields were located close to a 45-degree line. Exceptions were internal medicine, which fell below the 45-degree line, indicating that the number of physicians designating internal medicine as main area of practice exceeded the number of board-certified specialists, while allergology and rheumatology were located above the 45-degree line, indicating that the number of physicians designating “allergology” or “rheumatology” as their main area of practice were fewer than the number of board-certified specialists (Fig. 1).

3.3. Distribution of main area of practice by different year of experience groups in 2006

The main findings of the distribution of specialties is the younger generations engaging in internal medicine as their main area of practice gradually decreased, whereas the proportion engaged in internal medicine subspecialties and other specialties have steadily increased. This also indicates a general tendency for the younger generations of physicians to specialize, rather than working as generalists (Table 2).

3.4. Migration of main areas of practice in internal medicine and surgery groups at different career stages

Of the physicians who started their careers with internal medicine group as their main area of specialty in 1996 and registered as physician in the same year, 82.5% started their careers as physicians of internal medicine, gastroenterology; 5.4%, cardiology; 4.7%, neurology; 4.3%, pulmonology; 2.0%, other internal medicine; 0.6%. Some internal medicine physicians, however, differentiated to subspecialties of internal medicine subspecialties. A longitudinal analysis

of the cohorts revealed that the 1996 registration cohort with between 0 and 10 years of experience since registration showed a decrease in the proportion of involvement in internal medicine to 43.6% in the first 4 years, and to 37.0% in 10 years. The proportions of those involved in all other internal subspecialties except neurology, however, were found to significantly increase over that period. We found that in 10 years of experience, a proportion of physicians migrated to other specialties than internal medicine group (1996 registration cohort; 13.5%, 1986 registration cohort; 5.4%, 1976 registration cohort; 4.3%, 1966 registration cohort; 5.2%, 1956 registration cohort; 4.9%) or no report (18.3%, 10.4%, 10.3%, 20.0%, 43.4%, respectively). Neurology is a main area of practice with stable proportion, whereas other internal medicine group steadily decreases their proportion in 10 years (Table 3)

In the cohort of physicians who started their career in surgical specialty groups in 1996 and registered in 1996, 67.9% of them started their careers in surgery, which was significantly decrease in 10 years to 37.6%. The proportion of physicians involved in cardiovascular surgery (4.5–6.6%) and chest surgery (1.7–4.4%) and aesthetic plastic surgery (0.1–0.7%) increased for those with 10 years of experience, indicating that they increasingly specialized within the field of surgery. In physicians with between 10 and 20 years of experience and those with between 20 and 30 years of experience (1986 cohort and 1976 cohort, respectively), the proportion involved in subspecialties, except for neurosurgery, was quite stable. Among physicians engaged in surgical specialties, we found that over 10 years 9.1–16.8% of surgeons moved away from surgery to internal medicine (Table 4).

4. Discussion

4.1. Physicians' tendency to shift toward specialization, and the role of general practice

Our results indicated that the proportion of physicians involved in internal medicine decreased from 30.2% in 1996 to 25.4% in 2006, and those younger physicians were less likely to choose internal medicine, choosing internal medicine subspecialties and other specialties instead. These findings indicate an increasing tendency toward specialization of Japanese physicians overall, with fewer physicians joining primary care-oriented specialties.

In Japan, neither “general practice”, nor “family physician” is listed as areas of practice in the Government Order under Medical Law. So, the National Physicians Survey questionnaire did not list “general practice” or “family practice” as choices for the main area of practice. However, it is considered that a certain proportion of internal medicine physicians function as general practice and family medicine physicians. In Japan, especially in clinics, physicians provide medical services for which they have not received specific training [15]. By doing so, they effectively function as primary care physicians. In many countries, the right balance between specialist and generalist medical practitioners has been under discussion, and necessary measures have been undertaken [16]. This trend is contrary to the situation in the United States and

Table 3
Shift of main area of practice in 1996 after 10 years of practice (internal medicine group).

	Survey year						
	1996	1998	2000	2002	2004	2006	
1996 registration cohort (n = 2736) (0–10 years of experience during survey periods below)							
Internal medicine	82.5	55.1	43.6	40.8	38.8	37.0	**
Gastroenterology	5.4	8.2	9.6	9.6	10.0	10.3	**
Cardiology	4.7	10.3	11.9	11.1	10.8	11.1	**
Neurology	4.3	4.2	4.4	4.1	3.9	3.8	
Pulmonology	2.0	3.6	4.3	3.4	3.4	3.3	**
Other internal medicine	0.6	0.7	1.1	1.2	1.4	1.4	**
Surgeries	–	2.8	3.2	3.2	3.3	2.8	**
Others	–	8.3	8.9	9.6	9.2	10.7	**
No report	–	6.1	12.0	15.9	17.8	18.3	**
1986 registration cohort (n = 2499) (10–20 years of experience during survey periods below)							
Internal medicine	65.7	58.2	57.6	57.0	57.3	57.1	**
Gastroenterology	11.2	10.2	9.2	9.0	8.9	8.7	**
Cardiology	11.1	10.1	9.7	9.7	9.2	8.9	**
Neurology	4.0	3.6	3.3	3.6	3.4	3.0	
Pulmonology	5.3	4.2	3.8	3.4	3.7	4.0	.
Other internal medicine	1.4	1.2	1.3	1.1	1.5	1.3	
Surgeries	–	1.6	1.9	1.8	1.4	1.4	**
Others	–	2.6	3.4	3.6	4.0	4.0	**
No report	–	7.1	8.6	9.7	9.2	10.4	**
1976 registration cohort (n = 1625) (20–30 years of experience during survey periods below)							
Internal medicine	72.1	67.7	68.5	65.2	66.8	66.0	**
Gastroenterology	10.5	8.7	7.9	7.6	7.0	6.4	**
Cardiology	8.7	7.6	6.5	6.2	6.3	6.2	**
Neurology	2.8	2.5	2.0	2.4	2.7	2.6	
Pulmonology	3.7	3.3	2.8	3.0	3.0	2.6	
Other internal medicine	1.1	1.1	1.0	1.0	0.7	0.9	
Surgeries	–	1.8	1.8	1.7	1.3	1.8	**
Others	–	1.9	2.1	3.3	2.5	2.5	**
No report	–	4.4	6.3	8.7	9.1	10.3	**
1966 registration cohort (n = 1009) (30–40 years of experience during survey periods below)							
Internal medicine	81.8	74.7	72.4	69.9	66.9	65.7	**
Gastroenterology	9.5	7.5	7.1	6.3	6.3	4.6	**
Cardiology	4.2	3.3	3.3	2.5	2.3	2.3	.
Neurology	2.2	2.3	1.8	1.7	1.5	1.1	
Pulmonology	1.6	1.2	0.8	0.6	0.9	0.8	
Other internal medicine	0.4	0.3	0.3	0.5	0.4	0.2	
Surgeries	–	2.7	2.0	1.6	2.2	1.7	**
Others	–	2.2	3.4	3.6	3.6	3.5	**
No report	–	5.6	8.7	12.9	15.6	20.0	
1956 registration cohort (n = 1063) (40–50 years of experience during survey periods below)							
Internal medicine	87.9	74.9	69.9	60.4	53.2	46.4	**
Gastroenterology	6.5	5.0	4.0	3.4	3.2	2.8	**
Cardiology	2.8	2.3	1.6	1.6	1.3	1.1	**
Neurology	0.6	0.5	0.3	0.2	0.3	0.3	
Pulmonology	0.6	0.6	0.4	0.5	0.4	0.6	
Other internal medicine	0.8	0.9	0.8	0.8	0.7	0.3	
Surgeries	–	1.8	1.6	2.2	2.2	2.0	**
Others	–	2.9	3.5	2.3	3.5	2.9	**
No report	–	10.2	17.1	27.8	34.7	43.4	**

Other internal medicine includes: psychosomatic internal medicine, allergology, rheumatology.

* $p < .05$, 2×2 chi-square test respective specialties/other specialties \times 1996/2006.

** $p < .01$, 2×2 chi-square test respective specialties/other specialties \times 1996/2006.

Canada. One study indicated that the proportion of physicians involved in internal medicine in the United States increased from 16.0% in 1995 to 16.8% in 2007, the proportion engaged in family medicine increased from 8.2% to 8.9%, and the proportion involved in general practice decreased from 2.3% to 1.1%, [17]. In Canada, the proportion of physicians engaged in general internal medicine fell

from 4.3% in 1996 to 3.9% in 2006, with a slight decrease in the proportion of family physicians (general practice and family medicine) from 52.0% to 51.2% [18].

The Japanese postgraduate medical education program has significantly changed over the last few years [19–21]. Under the old program, physicians received postgraduate medical training in a single department from the begin-

Table 4
Shift of main area of practice in 1996 after 10 years of practice (surgical group).

	Survey year						
	1996	1998	2000	2002	2004	2006	
1996 registration cohort (n = 1142) (0–10 years of experience as physician during survey period)							
Surgery	67.9	54.4	46.2	39.5	39.8	37.6	**
Neurosurgery	17.5	14.6	13.2	12.9	11.7	11.4	**
Plastic surgery	6.0	3.2	3.5	2.9	2.8	2.5	**
Cardiovascular surgery	4.5	5.4	6.7	6.8	6.8	6.6	*
Pediatric surgery	2.4	0.7	1.1	1.4	1.4	1.4	
Chest surgery	1.7	1.9	2.7	2.6	3.5	4.4	**
Aesthetic plastic surgery	0.1	0.0	0.1	0.4	0.4	0.7	*
Internal medicine	–	5.7	6.3	8.1	8.2	9.1	**
Others	–	8.3	9.1	9.2	10.2	12.4	**
No report	–	5.7	10.9	16.3	15.1	14.0	**
1986 registration cohort (n = 1175) (10–20 years of experience as physician during survey period)							
Surgery	63.2	53.2	50.3	47.1	43.6	40.0	**
Neurosurgery	19.4	17.4	17.2	15.7	15.5	15.1	**
Plastic surgery	4.9	3.7	3.7	3.7	3.5	3.6	
Cardiovascular surgery	7.7	7.1	6.0	6.6	6.2	6.0	
Pediatric surgery	1.3	1.2	0.9	1.2	1.4	1.1	
Chest surgery	3.1	3.2	3.2	3.3	3.6	3.3	
Aesthetic plastic surgery	0.3	0.4	0.3	0.3	0.6	0.4	
Internal medicine	–	4.2	8.2	10.9	13.7	16.3	**
Others	–	3.1	4.9	4.7	6.0	7.5	**
No report	–	6.5	5.2	6.6	6.0	6.6	**
1976 registration cohort (n = 655) (20–30 years of experience as physician during survey period)							
Surgery	69.8	60.9	57.1	54.4	52.7	49.0	**
Neurosurgery	16.8	16.3	15.3	14.2	13.9	12.8	*
Plastic surgery	3.7	3.4	3.7	3.4	3.7	3.4	
Cardiovascular surgery	5.2	4.7	4.6	4.1	3.7	3.5	
Pediatric surgery	1.1	1.2	0.9	0.8	1.1	0.6	
Chest surgery	2.9	1.8	2.3	1.8	2.0	1.8	
Aesthetic plastic surgery	0.6	0.8	0.3	0.3	0.2	0.0	**
Internal medicine	–	5.2	6.7	10.2	11.6	14.2	**
Others	–	2.7	3.1	3.8	3.8	6.3	**
No report	–	2.9	6.1	7.0	7.5	8.4	**
1966 registration cohort (n = 393) (30–40 years of experience as physician during survey period)							
Surgery	74.3	63.9	57.8	47.6	44.0	36.9	**
Neurosurgery	14.2	13.7	14.0	12.7	12.7	9.2	*
Plastic surgery	3.1	2.8	2.8	2.8	2.3	1.5	
Cardiovascular surgery	4.6	3.8	3.8	3.3	3.3	1.5	*
Pediatric surgery	1.8	1.8	2.0	1.5	1.3	0.8	
Chest surgery	1.5	1.3	1.0	0.8	0.5	0.0	**
Aesthetic plastic surgery	0.5	0.0	0.0	0.0	0.3	0.0	**
Internal medicine	–	7.4	10.4	14.2	14.5	16.8	**
Others	–	2.0	3.1	3.8	4.3	6.1	**
No report	–	3.3	5.1	13.2	16.8	27.2	**
1956 registration cohort (n = 324) (40–50 years of experience as physician during survey period)							
Surgery	89.5	72.8	65.7	52.8	48.5	40.1	**
Neurosurgery	5.9	4.6	4.0	3.4	3.4	3.4	
Plastic surgery	1.9	0.3	0.3	0.0	0.0	0.0	**
Cardiovascular surgery	1.9	0.9	0.6	0.0	0.0	0.0	**
Pediatric surgery	0.0	0.3	0.0	0.0	0.0	0.0	**
Chest surgery	0.6	0.3	0.0	0.0	0.0	0.0	**
Aesthetic plastic surgery	0.3	0.3	0.3	0.3	0.0	0.0	**
Internal medicine	–	7.1	8.3	10.2	12.3	14.2	**
Others	–	2.8	4.3	5.9	5.6	4.3	**
No report	–	10.5	16.4	27.5	30.2	38.0	**

* $p < .05$, 2×2 chi-square test respective specialties/other specialties \times 1996/2006.

** $p < .01$, 2×2 chi-square test respective specialties/other specialties \times 1996/2006.

ning of the training program. Under the new program, during the first 2 years after graduation, they experience a rotation through multiple different departments. This change was implemented to enable physicians to provide a comprehensive range of medical services. Under the new program, residents are intended to become more

experienced and confident with basic skills and general knowledge, as a result of introducing new postgraduate medical education [22]. From an international perspective, the provision of primary health care is of great importance [23], and it is appropriate to secure a sufficient number of physicians that can provide primary