

図5 外科医師数将来推計

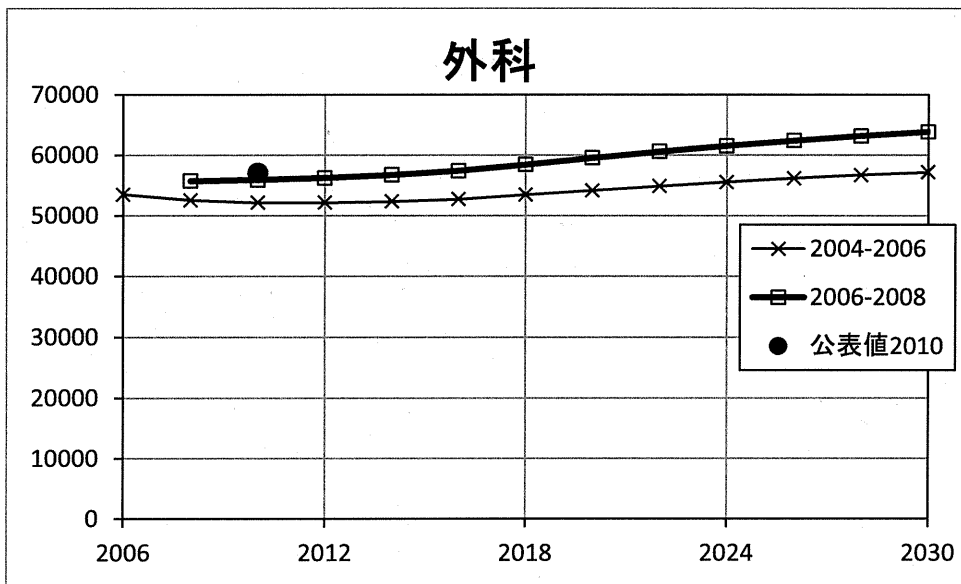


図6 産婦人科医師数将来推計

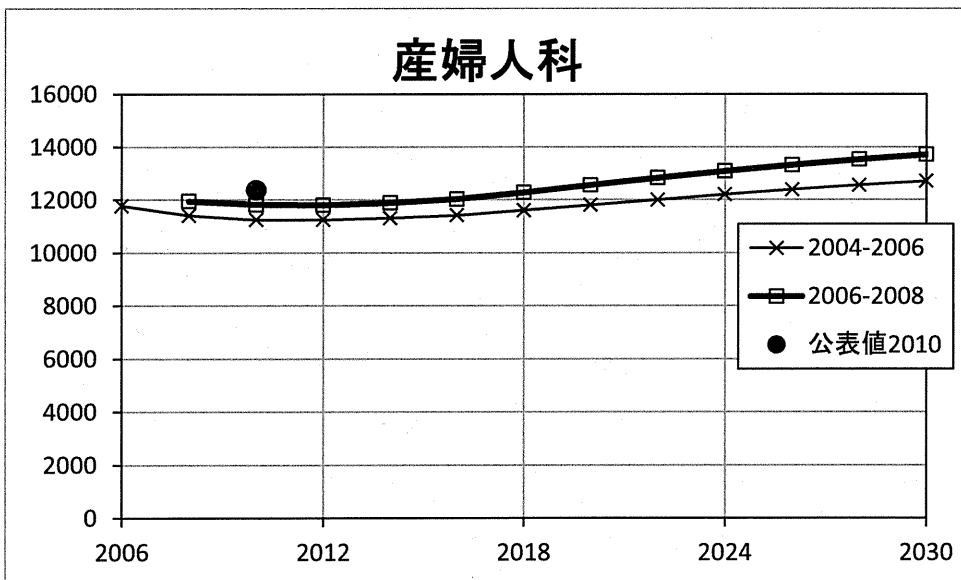


図7 精神科医師数将来推計

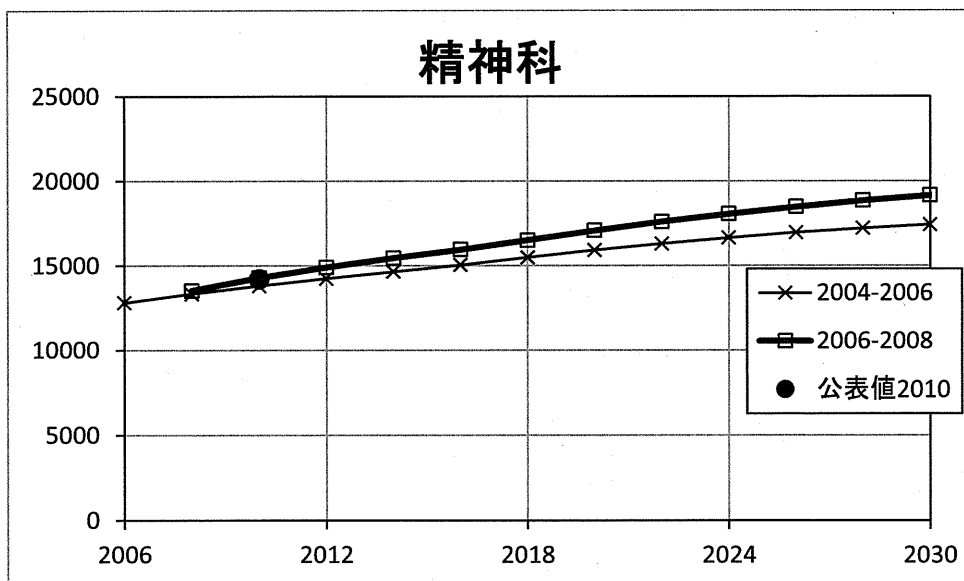


図8 その他医師数将来推計

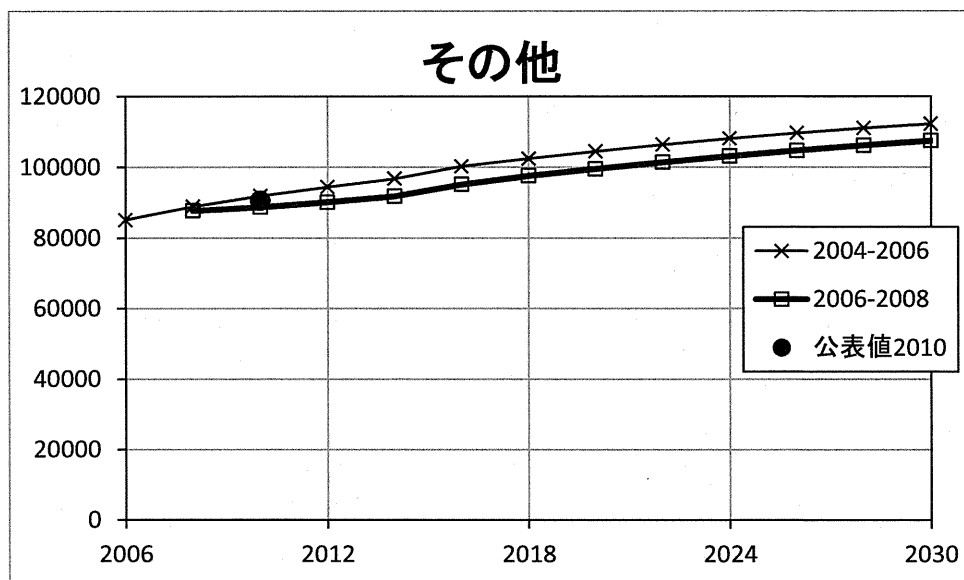


表1 2004年—2006年推計における診療科分類

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、泌尿器科、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、無記入

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	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、無記入

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	72.2
2012	229.7	81.4	12.4	11.2	41.2	8.9	74.6
2014	235.6	83.7	12.8	11.6	41.6	9.0	76.9
2016	243.1	86.2	13.3	12.0	42.2	9.1	80.2
2018	250.6	89.1	13.8	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	95.0	14.7	13.4	45.2	9.9	87.6
2024	273.4	97.9	15.1	13.9	46.3	10.2	90.1
2026	280.9	100.7	15.5	14.3	47.4	10.5	92.5
2028	288.3	103.5	15.9	14.7	48.5	10.7	95.0
2030	295.6	106.2	16.3	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	224.5	80.2	11.9	10.6	43.7	9.4	68.8
2010	228.3	82.0	12.1	11.2	43.9	9.3	69.7
2012	233.2	84.2	12.4	11.8	44.4	9.3	71.2
2014	239.1	86.7	12.7	12.3	45.1	9.4	72.9
2016	246.9	89.5	13.0	12.8	45.9	9.6	76.1
2018	255.2	92.7	13.4	13.3	47.1	9.9	78.7
2020	263.7	96.1	13.9	13.9	48.5	10.2	81.1
2022	272.3	99.6	14.3	14.5	49.9	10.6	83.5
2024	280.8	102.9	14.7	15.1	51.2	10.9	85.9
2026	289.2	106.2	15.2	15.6	52.6	11.2	88.4
2028	297.5	109.4	15.6	16.1	54.0	11.6	90.8
2030	305.7	112.6	16.0	16.6	55.4	11.9	93.3

研究成果の刊行に関する一覧表

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
児玉知子、小池 創一、松本伸 哉、井出博生、 今村知明	女性医師割合の高い診療科（眼科・皮膚科・麻酔科）におけるキャリアパスについて	厚生指標	58(8)	1-7	2011
Kodama T, Koike S, Matsumoto S, Ide H, Yasunaga H, Imamura T	The working status of Japanese female physicians by area of practice: Cohort analysis of taking leave, returning to work, and changing specialties from 1984 to 2004.	Health Policy		<i>Epub ahead of print</i> <i>PMID: 21908067</i>	2011
Koike S, Ide H, Kodama T, Matsumoto S, Yasunaga H, Imamura T.	Physician-Scientists in Japan: Attrition, Retention, and Implications for the Future.	Academic Medicine		<i>In Press</i>	2012

女性医師割合の高い診療科（眼科・皮膚科・麻酔科）におけるキャリアパスについて

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目的 本研究では、医師・歯科医師・薬剤師調査（以下、三師調査）コホートデータを用いて比較的女性医師割合の高い眼科、皮膚科、麻酔科における女性医師のキャリアパスを検討し、医籍登録後（以下、登録後）の就業における動態を把握する。

方法 1984年、1994年、2004年の三師調査において診療科の女性医師割合を年齢階級別に比較した。さらに、医籍登録番号で統合されたコホートデータを作成し、女性医師割合の高い眼科、皮膚科、麻酔科について、1984年医籍登録者と1994年医籍登録者における女性医師の就労継続、復職、休職、診療科の届け出変更について分析した。

結果 2004年調査における女性医師割合は、眼科36.8%、皮膚科38.0%、麻酔科29.1%と高率であった。1984、1994、2004年時の女性医師割合を年齢階級別に比較したところ、すべての年齢階級において眼科には有意差がなく、皮膚科、麻酔科では有意な女性医師割合の増加がみられた。特に29歳以下の若年齢層においては眼科51.5%、皮膚科68.4%、麻酔科46.8%と高率であった。1984年医籍登録者と1994年医籍登録者の登録後10年時における在職率の比較では、眼科において1994年登録者で有意に高かった。1984年登録者の20年後の在職率は、眼科で95%、皮膚科で107%（中途参入含む）、麻酔科で55%であった。麻酔科では登録後4～6年時で診療科の変更が多く、眼科から他科への変更は1%未満と低率であった。隔年調査での平均復職率は、眼科12%、皮膚科18%、麻酔科10%であり、麻酔科で休職率が復職率を上回っていた。

結論 眼科、皮膚科、麻酔科においては女性医師の割合が高く、特に眼科、皮膚科では登録後20年時の在職率が非常に高いことが明らかとなった。離職のピークは眼科、皮膚科においては登録後8～10年であり、麻酔科においては明らかなピークは認めなかった。女性医師の継続就労、休職、復職パターンは診療科によって異なる可能性があることが示唆された。

キーワード 女性医師、キャリアパス、医師・歯科医師・薬剤師調査、眼科、皮膚科、麻酔科

I はじめに

昨今の医師の活動状況を検討するにあたっては、医師のキャリアパスに影響を与える種々の要因を踏まえた動態の把握が必要である。中でも、昨今の女性医師の増加は、医師全体の需給

バランスを考えるうえでも重要な因子となっている。OECD加盟諸国において女性医師の割合が高いのは、フィンランド54.6%を筆頭に、EU諸国では40%前後、米国においては30.1%であるが、日本は17.4%と最も低い割合にある¹⁾。しかしながら、近年の医師・歯科医師・

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薬剤師調査（以下、三師調査）における若年医師の女性割合は確実に増加していることから、今後は医師全体に占める女性の割合も諸外国並みに増加すると予測される。これまでに女性医師の離職ピークは登録後約8～10年であり、一度離職した医師も年数をかけて復職している現状が報告されている²⁾³⁾。本研究では、診療科の中でも、比較的女性医師割合の高い眼科、皮膚科、麻酔科について、コホートデータを用いて医籍登録後の女性医師の就労状況について検討する。

II 研究方法

1984年、1994年、2004年の三師調査において届け出のあった診療科の女性医師割合を年齢階級別に比較した。この際、分析対象とした診療科は、三師調査に「従事する診療科」（1994年以降は「主たる診療科」）として眼科、皮膚科、麻酔科の届け出があったものとし、比較対照のために内科、内科サブスペシャリティ、外科、外科サブスペシャリティを加えた。内科サブスペシャリティは、心療内科、呼吸器科、消化器科、循環器科、神経内科、アレルギー科、リウマチ科とし、外科サブスペシャリティは整形外科、形成外科、美容外科、脳神経外科、呼吸器外科、心臓血管外科、小児外科を集計した。従事する診療科で内科、外科においてサブスペシャリティと同時に複数診療科を届け出ている場合、サブスペシャリティを優先し、重複のな

いものとした。眼科、皮膚科、麻酔科においては診療科の重複はない。

さらに、医籍登録番号で統合されたコホートデータから、1984年登録者と1994年登録者における眼科、皮膚科、麻酔科の届け出があった女性医師の在職率、就労継続、復職、休職、診療科の届出変更について分析した。在職率は、医籍登録後初めての調査時（登録後2年目）において、それぞれ眼科、皮膚科、麻酔科の診療科を届け出た女性医師数を分母とし、分子は登録後の三師調査において同診療科を届け出た女性医師数とした。就労については、各年の三師調査の診療科の届け出において、同じ診療科で連続する三師調査に就労を届け出たものを「継続」、他科に変更のあったものを「転出」、他科からの変更を「転入」、無職の届け出もしくは未届けのものを「休職」、前回の三師調査で無職の届け出もしくは未届けであったものが、次回に就労の届け出をしたものを「復職」とした。この際、復職時に診療科の変更があったものも、一律に「復職」として扱った。

なお、年齢階級別の女性医師割合の比較にはchi-square testを用い、有意水準は5%（両側）とした。統計ソフトはSTATA10.0を使用した。

三師調査データは厚生労働統計の目的外利用として電子個票データを申請し許可を得た。データには個人が識別されるデータは含まれていない。また、本研究実施に際しては、国立保健医療科学院疫学研究倫理審査委員会の承認を得た。

III 研究結果

表1 1984, 1994, 2004年三師調査における女性医師の割合

(単位: 人, ()内%)

	1984年 (n = 170,469) ¹⁾	1994 (n = 218,215) ¹⁾	2004 (n = 256,656) ¹⁾
女性医師総数	17 216(10.1)	27 208(12.5)	42 035(16.4)
内科	6 516(8.9)	8 305(11.8)	10 919(14.8)***
内科サブスペシャリティ	352(7.6)	1 680(9.1)	3 519(12.5)***
外科	189(1.1)	479(2.0)	1 079(4.6)***
外科サブスペシャリティ	297(2.2)	740(3.0)	1 579(5.0)*
眼科	2 516(34.5)	3 618(36.0)	4 585(36.8)
皮膚科	908(27.0)	1 901(29.6)	2 956(38.0)***
麻酔科	478(18.8)	1 047(22.6)	1 859(29.1)***

注 1) nは医師数総数である。

2) *p < 0.05, ***p < 0.001 (Chi-square test)

(1) 眼科、皮膚科、麻酔科における女性医師割合の経年変化

2004年調査における女性医師割合は、眼科36.8%、皮膚科38.0%、麻酔科29.1%であった(表1)。医師全体における女性の割合は、1984年から2004年に全体で約1.6倍となっているが、診療科レベルでは外科で1.1%から4.6%へ4.2倍と最も高い

増加を認めており、外科サブスペシャリティ、内科、内科サブスペシャリティにおいて約2倍の増加を認めた。1984年時点ですでに女性医師割合が比較的高かった眼科においては、34.5%から36.8%とほぼ変化なく、皮膚科では27.0%から38.0%へ1.4倍、麻酔科で18.8%から29.1%へ1.6倍の増加がみられた。眼科、皮膚科、麻酔科のいずれの科においても、内科および内科サブスペシャリティの2倍以上の女性医師割合となっている。1984年、1994年、2004年調査における女性医師割合の変化を年齢階級別（29歳以下、30～39、40～49、50～59歳）に比較した結果では、ほぼすべての診療科において各年齢階級で有意な女性医師割合の増加を認めたが、眼科においては有意差がみられなかった（表2）。一方で、29歳以下における1984年調査と2004年調査の比較では、眼科で38.6%から51.5%へ、皮膚科で41.5%から68.4%へ、麻酔科で24.8%から46.8%へと、これら3つの各診療科医師の半数程度を女性が占めており、他の年齢階級と比較して最も高い女性医師割合であった。また、内科や内科サブスペシャリティ、外科においても各年齢階級で有意な女性医師割合の増加を認めているが、眼科、皮膚科、麻酔科と比較して女性医師割合は15～30%前後少ない。

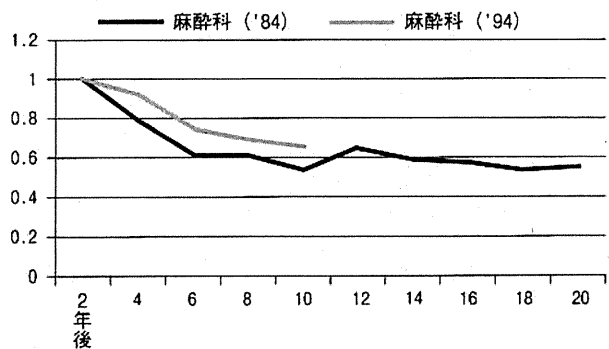
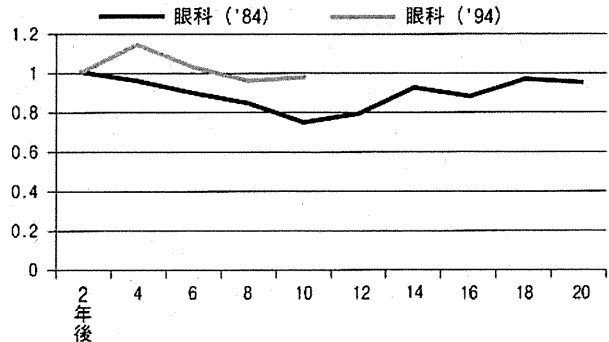
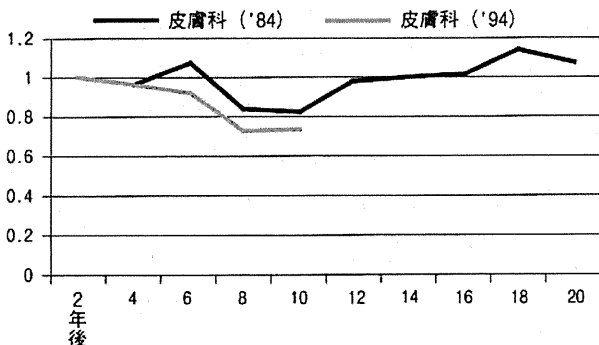
表2 1984, 1994, 2004年三師調査における年齢階級別女性医師の割合

(単位 人、()内%)

	1984年	1994	2004
内科			
29歳以下	1 109(14.7)	1 878(26.9)	1 889(35.6)***
30～39歳	1 285(8.6)	2 488(15.3)	3 324(26.3)***
40～49	735(6.7)	1 315(9.1)	2 604(14.2)***
50～59	1 382(7.5)	584(7.1)	1 343(8.6)***
内科サブスペシャリティ			
29歳以下	127(11.7)	544(23.0)	823(30.6)***
30～39歳	164(7.4)	748(9.9)	1 692(17.3)***
40～49	35(4.8)	273(5.7)	687(8.2)***
50～59	22(5.2)	61(3.0)	243(5.3)***
外科			
29歳以下	64(1.9)	206(6.5)	455(20.8)***
30～39歳	57(1.0)	192(2.5)	447(7.4)***
40～49	11(0.4)	28(0.6)	141(2.3)***
50～59	30(1.0)	10(0.3)	20(0.5)***
外科サブスペシャリティ			
29歳以下	114(3.8)	278(8.2)	428(15.9)*
30～39歳	83(1.6)	287(2.9)	772(8.1)*
40～49	32(1.1)	92(1.6)	246(2.5)*
50～59	35(1.8)	27(0.8)	73(1.4)*
眼科			
29歳以下	386(38.6)	692(47.5)	491(51.5)
30～39歳	558(31.2)	981(32.6)	1 440(38.5)
40～49	342(32.8)	649(32.0)	1 113(33.0)
50～59	599(37.6)	334(33.1)	673(33.0)
皮膚科			
29歳以下	250(41.5)	410(53.2)	497(68.4)***
30～39歳	357(30.0)	674(36.6)	913(45.9)***
40～49	191(26.5)	472(31.2)	788(38.0)***
50～59	65(13.0)	200(24.6)	486(32.1)***
麻酔科			
29歳以下	236(24.8)	373(32.4)	519(46.8)***
30～39歳	188(16.4)	455(21.6)	752(33.9)***
40～49	47(17.8)	172(17.3)	410(21.2)***
50～59	4(2.6)	42(16.5)	153(17.1)***

注 *p<0.05, ***p<0.001 (Chi-square test)

図1 1984年および1994年医籍登録の女性医師における医籍登録後の在職率



(2) 1984年医籍登録者と1994年医籍登録者における登録後在職率の比較

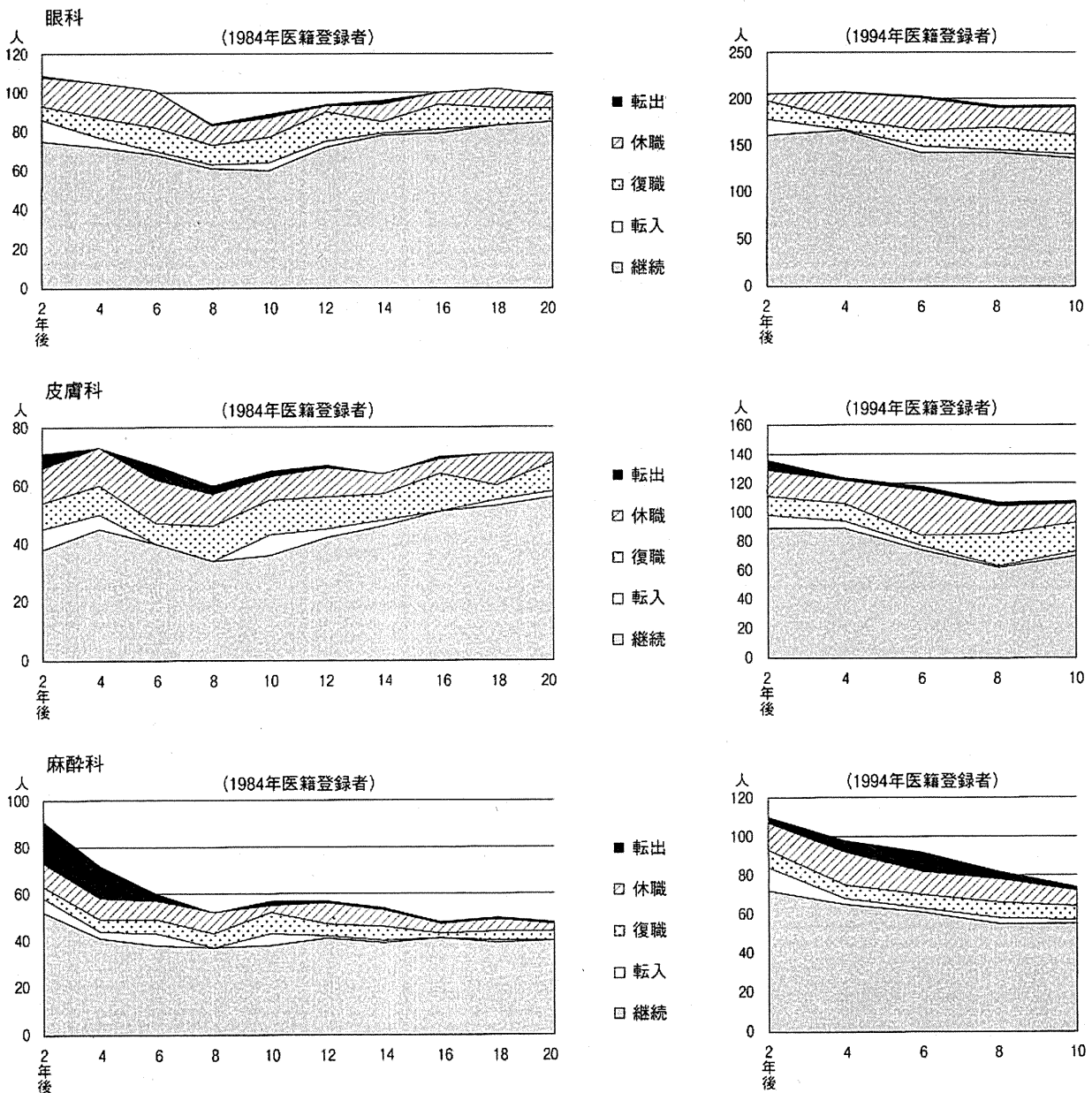
次に、眼科、皮膚科、麻酔科の1984年医籍登録者（以下、登録者）と1994年登録者の登録後10年時における在職率の比較では、眼科においては1994年登録者98%、1984年登録者75%であり、1994年登録者の在職率が有意に高かった（図1）。さらに1984年登録者の20年後の在職率は、眼科で95%、皮膚科で107%（中途参入含む）、麻酔科で55%であった。眼科、皮膚科における離職のピークは登録後8～10年時と考

えられ、皮膚科では1984年登録者の方が1994年登録者よりも高い在職率にある傾向がみられた。麻酔科では1984年、1994年登録者ともに登録後間もなく在職率が低下しはじめ、登録後6～8年時にはほぼ横ばいとなり、その後は登録後当初の約50～60%程度の在職率となっていた。

(3) 1984年と1994年登録者における就労継続、休職、復職、診療科の変更（転入・転出）

眼科、皮膚科、麻酔科における1984年登録者の母集団はいずれも100人前後であったが、登

図2 眼科・皮膚科・麻酔科における女性医師の就労継続・休職・復職・診療科の変更（転入・転出）



録後20年目では麻酔科で母集団の約50～60%となっていた。診療科の変更について、1984年登録者では、麻酔科で登録後2～4年時における診療科の変更（転出）が多く、眼科から他科への変更（転出）は平均で1%未満と低率であった。また皮膚科では登録後2年と6～8年時に2回の転出ピークがみられており、転入は登録後2～4年、10年以降においても確認された。各診療科の平均復職率は、眼科12%、皮膚科18%、麻酔科10%であり、麻酔科で休職者数が復職者数を上回っていた。母集団の中で、継続就労、休職、復職、変更（転出、転入）のいずれのカテゴリにも入っていない登録者は、2回の連続する三師調査に未届けであった医師である。例をあげると、眼科、皮膚科では登録後8年時に母集団のディップ（溝）がみられているが、これは登録後6年時、8年時のいずれの三師調査にも未届けであった医師である。しかしながら、登録後20年時には医籍登録時点の母集団とほぼ同等の母集団が把握できており、登録後20年時の在職率は、眼科で95%、皮膚科で107%（中途参入含む）、麻酔科で55%であった。

1994年登録者は、眼科、皮膚科においては1984年登録者の約2倍の母集団であった。眼科における休職のピークは登録後6年時頃であるが、1984年と比較して明らかなピークはみられず、登録後8～10年では休職者と復職者がほぼ同数のコンスタントな需給状況がみられる。一方、皮膚科では登録後6年時の休職者数が最も多いが、登録後8年時からの復職者数は休職者数を上回っている。麻酔科においては、1984年と比較すると診療科の変更（転出）のピークが登録後6年時となっており、転出者も1984年と比較して少ない。しかし、休職者数が復職者数を上回っている状況は1984年より顕著である。

IV 考 察

(1) 診療科による女性医師の就労状況

今回の分析では、女性医師の就労継続や復職、診療科の変更が診療科別に異なる可能性が示唆された。これまでの女性医師の登録後の就労状

況についての研究において、登録後10年程度をピークに休職率が高くなることが明らかになっていることはすでに述べたが²²⁾³⁾、眼科においては、このピークがさほど顕著でなかった。他の診療科と比較すると、登録後10年までの休職率が高く、その後はコンスタントに復職が続いている。つまり、眼科においては、他の診療科における医師よりも登録後早い時期に休職している可能性がある。一方、継続率、復職率も高いため20年後の在職割合は95%と高くなっていた。1984年、1994年、2004年調査における女性医師割合を年齢階級別（29歳以下、30～39、40～49、50～59歳）に比較した結果では、ほぼすべての診療科において有意な女性医師の割合の増加を認めているが、眼科のみ有意差がみられておらず、1984年当初より高い女性医師割合の傾向が続いていることが示唆された。このことは、眼科における診療形態が女性医師にとって継続して働きやすい傾向にあることが予想される。また眼科以外の診療科に変更する割合も低いのは、眼科における専門性が高いことが示唆される。眼科の学会アンケート調査では、約80%の大学附属病院で、妊娠・育児中の女性医師に対して勤務時間・当直免除などの何らかの配慮がなされていると報告されている⁴⁾。一方、同調査において大学における女性医師のキャリアパスとして、女性医師の割合が、助手・助教授（25%）、講師（15%）、教授（6%）と昇進に伴って比率が低下していることを報告しており、女性にとって働きやすい職場であることと、継続したキャリアを積んで社会的地位を獲得することには何らかの社会的ギャップがあることが示唆される。仕事と家庭のバランスの置き方にはいうまでもなく個人差があるが、オーストラリア・ニュージーランドの調査では、女性眼科医は男性眼科医に比べて仕事の満足度に差はみられないものの、労働時間および賃金が少なく、結婚して子どもをもつ割合が男性より低いと報告しており⁵⁾、ワークライフバランスの問題は各国を問わず存在していることが明らかである。

一方、皮膚科においては、眼科と同様に登録

後10年までの休職者が比較的多く、同時に復職者も多かった。皮膚科の学会アンケート調査でも、女性医師の約半数が離職の経験を持ち、その80%が最初の10年間に離職していると報告されており、本研究結果を裏付けるものである⁶⁾。また、20年後の在職率は、転入者を含めると当初の母集団を越える結果となった。登録後10年以降も就労が可能であるということは、皮膚科の診療形態も眼科と同様に女性医師にとって継続して働きやすく、かつ専門性が高いということが考えられる。海外の医学生対象調査でも、ライフスタイルと調和する専門領域(specialty)として皮膚科、一般医療(general practice)、公衆衛生があげられている⁷⁾。

麻酔科では、登録後4年までは平均20%の転出がみられた。これには、もともと卒業時に外科系や産婦人科等の診療科選択希望があり、その前の研修の一部として麻酔科を選択していた可能性がある。また、20年後の在職割合が55%程度と、眼科や皮膚科と比して半分の割合であり、若年女性医師に麻酔科選択者が多かったとしても、10~20年後の麻酔科全体の労働力推計には換算できない可能性が高い。麻酔医に対するアンケート調査では、幼少時期の育児を母親の役割とする社会的性別意識の問題点と女性医師に対する育児支援体制の不備が指摘されている⁸⁾。さらに、麻酔科の診療領域には、集中治療、ペインクリニック、救急医療、緩和医療など手術麻酔以外の多様な業務のほか、24時間フルタイムで働ける医師だけが必要といったスタンスの勤務環境の問題点が指摘されており、女性医師の再教育や復帰支援を進めていくなかでは、男女を問わず、すべてのスタッフの労働環境や労働時間に対する配慮を行うことが重要である⁹⁾。

上記については、ある程度専門とする診療科が決まった後の女性医師の継続した働き方について述べてきた。しかしながら、今回の結果でも明らかなように、近年は若年医師における女性の割合が増加傾向にあるため、今後は臨床研修をはじめ、各診療科における専門分野別のトレーニング体制をどのように整えるかが大きな

課題となるであろう。女性医師が妊娠、出産、育児に伴う離職を必要とされた際に、ライフスタイルに合わせた自由なスケジュールを組むことが可能な研修やトレーニング体制のあり方についても検討される必要がある。

(2) 女性医師コホート分析の問題点

通常のコホート分析では、母集団のある一定の観察期間中の転帰を分析するが、今回のような隔年実施の統計調査データを用いることには限界がある。一つには、調査が隔年12月に実施されることから、医師の就労届出状態が、あくまでも調査時点の就労状況に基づくということである。従って、今回の研究で継続就労とした定義が、必ずしも2年間継続して就労していたということではなく、あくまでも2回の調査時に就労していたということである。実際には次回の三師調査までの2年間の期間中に、休職、復職がなされていた可能性がある。さらに、女性医師の場合、個人によって、登録後20年間の間に1回だけ休職をする者、数回の休職を繰り返す者、全く休職しないものを含め、休職のパターンに大きなばらつきがあった。今回の分析では、このように2回の連続する三師調査時点における就労状況の変化を分析したことから、2回の三師調査に連続して届け出がなかった者については、休職の定義に含まれていない。このため、図2において観察者の合計数がディップ(溝)となっている。本稿では、継続就労者に関する詳細な分析は対象としなかったが、1984年登録女性医師全体においては、20年間継続して診療に従事していた医師は約3割程度であった。つまり、7割近くの女性医師は何らかのパターンで休職、復職を繰り返していることが容易に想像される。診療現場における医師の需要と供給のバランスは絶えず変動しており、医師の人材や労働力把握を適切に行うためには、医師の就労動向をリアルタイムで把握する必要がある。リアルタイムでの適切な人材供給がなされるシステムが構築されていれば、医療現場における人材不足の問題を解決する一助となるであろうし、女性医師自身にとっても、比較的柔軟に休

職や復職を繰り返しながら、継続して医師の業務に携わることが可能となるであろう。

本研究では、比較的女性医師割合の高い眼科、麻酔科、皮膚科において、女性医師の登録後の就労状況に関して、統計調査データを基に分析を試みた。今後は、これらの診療科、さらには女性医師割合が低い診療科においても、女性医師が就労継続可能な具体的な条件や環境整備についての詳細な検討が期待される。

V 結 論

眼科、皮膚科、麻酔科においては女性医師の割合が高く、特に眼科、皮膚科では登録後20年時の在職率が非常に高いことが明らかとなった。離職のピークは眼科、皮膚科においては登録後8～10年であり、麻酔科においては明らかなピークは認めなかった。女性医師の継続就労、休職、復職パターンは診療科によって異なる可能性があることが示唆された。

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文 献

- 1) OECD Health Data 2010.
- 2) Kaneto C, Toyokawa S, Inoue K, et al. Gender difference in physician workforce participation in Japan. *Health Policy* 2009; 89(1): 115-23.
- 3) 女性医師の卒後就労分析. 平成19年度厚生労働科学研究費補助金政策科学総合研究事業(政策科学推進研究事業)医師のキャリアパスを踏まえた動態把握のあり方及びその有効活用に関する研究. 総括・分担研究報告書. 15-20.
- 4) 眼科女性医師活性化委員会. 眼科女性医師に関するアンケート調査の報告. *日本の眼科* 2008; 79(3): 311-5.
- 5) Danesh-Meyer HV, Deva NC, Ku JY, et al. Differences in practice and personal profiles between male and female ophthalmologists. *Clin Experiment Ophthalmol.* 2007 May-Jun; 35(4): 318-23.
- 6) 檜垣祐子, 泉美貴. 女性医師のキャリア支援. *臨床皮膚科* 2010; 64(5): 180-2.
- 7) Creed PA, Searle J, Rogers ME. Medical specialty prestige and lifestyle preferences for medical students. *Soc Sci Med.* 2010 Sep; 71(6): 1084-8. Epub 2010 Jul 13.
- 8) 上田聡子, 中村真之, 野上裕子. 女性麻酔科医の現況に関する調査研究(続報)-社会的性別意識と育児負担-. *日本臨床麻酔学会誌* 2006; 26(4): 418-28.
- 9) 澄川耕二. 女性医師復帰支援プログラム (Vol. 2) 長崎大学病院の女性医師麻酔科復帰支援プロジェクト. *医学のあゆみ* 2010; 233(7): 570-3.



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The working status of Japanese female physicians by area of practice: Cohort analysis of taking leave, returning to work, and changing specialties from 1984 to 2004

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ABSTRACT

Background: The percentage of females in the physician workforce is increasing in Japan, as in other countries; however, the working status of female physicians has not been sufficiently investigated.

Methods: Original data were obtained from the National Survey of Physicians (NSP) conducted by the Ministry of Health, Labour and Welfare, Japan, from 1984 to 2004. We examined the trend of female physicians' areas of practice and analyzed their leave, return to work, and change in areas of practice using cohort data.

Results: The percentage of female physicians has increased significantly in recent generations, especially in surgery, surgical subareas of practice, and obstetrics and gynecology. A remarkable increase was found in obstetrics and gynecology among women under 29 years old from 15.4 to 66.2%. The total number of female physicians on leave has been higher than the number of female physicians returning since 1998. The average percentage of those who changed their area of practice was high in surgery (20.7%) and low in pediatrics (5.0%) and obstetrics and gynecology (1.7%).

Conclusions: A strategic plan is needed for future health policy to plan for the physician workforce, especially for the areas of practice with increasing proportions of young female physicians.

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1. Background

An increase in the number of women in medicine has been reported in Australia, Canada, the Netherlands, Norway, Sweden, the United Kingdom and the USA [1–7]. Although these countries have different healthcare systems

and social circumstances, a higher percentage of women in medicine has significant implications for workforce planning because of their career breaks or part-time work status [8–10]. Internationally, the proportion of females in the physician workforce increased by around 30% – from 28.7% in 1990 to 38.3% in 2005 in OECD countries and flexibility in working time and career development is emphasized for policy makers because that female physicians work fewer weekly hours than male physicians in many OECD countries [11].

In Japan, the percentage of females among all physicians (approximately 250,000) was 16.4% in 2004. However,

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during the last decade, the percentage of female students enrolled at medical schools has increased to approximately 30% [12], indicating that the proportion of female physicians is likely to increase in the future.

In recent years, physician shortages and an imbalance in the numbers of physicians in different areas of practice have occurred in Japan, as in Western societies, not only in specific specialties, such as pediatrics and obstetrics, but also in internal medicine and surgery [13–17]. The increasing proportion of female physicians is considered to be one of the reasons that has exacerbated physician shortage, with the hypothesis that female physicians leave work completely after marriage or go on leave for a long period of time to raise their children. However, there is little concrete evidence about the actual working status of female physicians nationally. Therefore, we aimed to determine the percentages of female physicians by area of practice over two decades and the patterns of taking leave from and returning to work in four areas of practice: internal medicine, surgery, obstetrics and gynecology, and pediatrics. This information can be used for future health policy planning relevant to the physician workforce.

2. Materials and methods

2.1. Data acquisition

Data were obtained from the National Survey of Physicians (NSP) from 1984 to 2004, with official permission from the Ministry of Health, Labour and Welfare (MHLW) of Japan. The NSP was conducted every year from 1972 to 1982 and has been conducted every other year since 1984. The survey was designed as a form of census and the response rate was considered to be quite high; therefore, it was used to try and understand Japanese physicians' career choices or distribution in previous studies [13–15,18–20]. The survey questionnaires are distributed to physicians' workplaces. It is mandatory for physicians to report their working status and information on medical areas of practice by filling in the questionnaire, which is sent back to the MHLW by the local health centers. Although the NSP is still conducted at present, we used the data collected before 2004 to avoid inconsistency in the analysis of specialty changes, which might have resulted from the use of later data because the ministry began requiring clinical training for newly registered physicians after 2004.

The data allowed to be used in this study were electronic data with no personally identifiable information except for each physician's registration (license) number, which was not disclosed to the public and could not be linked to the physicians' private information, such as name and address. This study was approved by the Research Ethics Committee of the National Institution of Public Health in July 2009.

2.2. Data analysis

2.2.1. Trends in the proportion of female physicians by area of practice

The percentages of female physicians by area of practice were obtained from cross-sectional data in 1984, 1994 and 2004. The area of practice preferred among

female physicians under 29 years old was recorded. For the area of practice categories, the "main area of practice" coding in the NSP was employed; these categories included internal medicine, surgery, pediatrics, psychiatry and neurology, obstetrics and gynecology, ophthalmology, otolaryngology, dermatology, rehabilitation medicine, radiology, anesthesiology, general medicine (rotation), and other. In compiling the data, psychosomatic internal medicine, respiratory medicine, gastroenterology, cardiology, neurology, allergy and immunology, and rheumatology were considered to be subareas within internal medicine; orthopedic surgery, plastic surgery, cosmetic surgery, neurosurgery, respiratory surgery, cardiovascular surgery and pediatric surgery were considered to be subareas within surgery. The coding of 'obstetrics and gynecology' was unified in the NSP questionnaire. Coding of "main area of practice" in the survey questionnaire was officially introduced in 1994. Therefore, we recoded the "main area of practice" from the multiple "areas of practice" reported in the surveys from 1984 to 1994. In the recoding, if internal medicine and one internal medicine subarea of practice were chosen for "areas of practice", the subarea of practice was employed as the "main area of practice". If internal medicine and more than two internal medicine subareas of practice were chosen, then internal medicine was employed as the "main area of practice". The recoding of surgery and surgical subareas of practice also followed this rule. Rehabilitation medicine was officially added to the coding scheme in the 1994 NSP. The statistical significance of the differences in the proportion of female physicians in each area of practice between 1984, 1994 and 2004 were examined using the Chi-squared test. Statistical differences were assessed with two-sided tests, with an alpha level of 0.05.

2.2.2. Female physicians' leave and return to work by area of practice from 1984 to 2004

The cohort data were taken from the original data of the NSP from 1984 to 2004 using the registration numbers of the physicians. To examine the trends leave taken by female physicians after registration (licensing), the average percentages of female physicians on leave by years after registration were obtained by categorizing their year of registration (1981–1985, 1986–1990, 1991–1995, and 1996–1999).

Further, the numbers of female physicians who were newly registered returned to work or went on leave for consecutive biennial NSPs were obtained between 1984 and 2004. To observe the changes in the numbers of working female physicians, we selected internal medicine, surgery, pediatrics, and obstetrics and gynecology, which have had a relatively large increase in the proportion of female physicians since 1984. The analysis was conducted only on those with a minimum of 4 years' experience after registration, reflecting the fact that some physicians undertake 2 years of general rotation as initial clinical training after obtaining their licenses. The analysis period was set to the period after 1984, when the survey frequency was changed from annual to biennial.

The average percentages of those continuing work, on leave, returning to work and changing their area of practice

(in and out) were calculated for 1984–1994 and 1994–2004 using cohort data from 1984 to 2004. Those registered in an area of practice in Year *N* and still registered in the same area of practice in the next survey in Year *N*+2 were classified in the “continue” work category; those registered in an area of practice in Year *N* and not registered in any area of practice or registered as “a physician not in practice” in the next survey in Year *N*+2 were classified in the “on leave” category; those not registered in any area of practice or registered as “a physician not in practice” in Year *N* and registered in an area of practice in Year *N*+2 were counted, regardless of the previous area of practice, in the “return” category; those registered in one area of practice in Year *N* and registered in the relevant area of practice in Year *N*+2 were, regardless of the previous area of practice, classified in the “change in” category; and those registered in the relevant area of practice in Year *N* and registered in a different area of practice in Year *N*+2 were, regardless of the next area of practice, classified in the “change out” category. To calculate the percentages of female physicians in the “continue”, “on leave”, “return”, “change in” and “change out” categories in each area of practice, the total number of female physicians registered in the relevant area of practice either in Year *N* or in Year *N*+2 was used as a denominator. Because most female physicians go on leave for different durations, we averaged the percentages of every two consecutive NSPs during 1984–1994 and 1994–2004.

For data management and analysis, STATA 10 (StataCorp LP, 2007, TX, USA) and SPSS16.0J (SPSS Japan Inc., Tokyo, Japan) statistical software were used for this study.

3. Results

3.1. Increasing percentage of female physicians and their choice in the area of practice

The numbers and percentages of female physicians by area of practice in 1984, 1994 and 2004 are shown in Table 1. The proportion of female physicians increased from 10.1% in 1984 to 16.4% in 2004. In the 2004 survey, the specialties with a high percentage of females were dermatology (38.0%), ophthalmology (36.8%) and pediatrics (31.2%). The proportion of female physicians remained high in ophthalmology, and this was the only area of practice for which there was no significant increase or decrease in the percentage of female physicians between 1984 and 2004 other than rehabilitation medicine.

The proportion of female physicians under 29 years old increased dramatically, from 14.6% in 1984 to 35.3% in 2004, as shown in Table 2. The 2004 survey shows that female physicians accounted for almost half or more of all physicians in dermatology (68.4%), obstetrics and gynecology (66.2%), ophthalmology (51.5%), pediatrics (49.2%) and anesthesiology (46.8%). The greatest increases from 1984 to 2004 in the percentage of female physicians under 29 years old were observed in the areas of surgery (10.8 times), surgical subareas of practice (4.2 times), obstetrics and gynecology (4.3 times), and internal medicine (2.4 times).

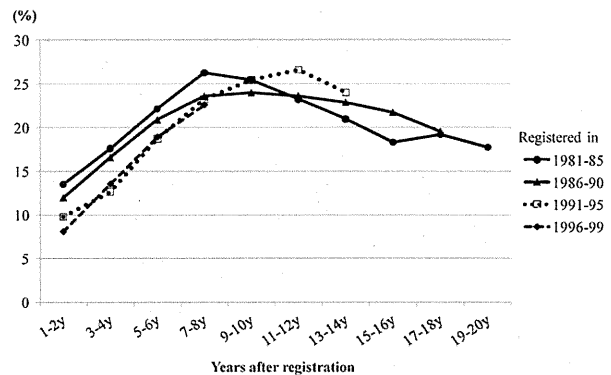


Fig. 1. The trend for the number of female physicians on leave who registered from 1981 to 1999, by years after registration.

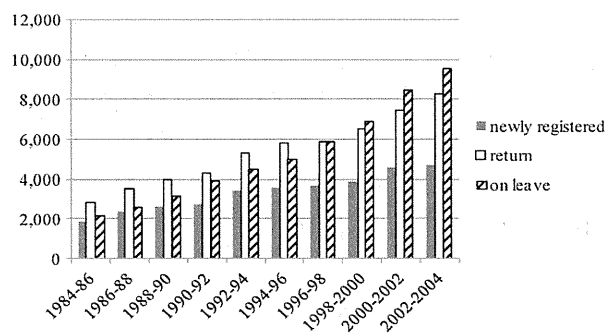


Fig. 2. Number of female physicians who were newly registered, returned to work or went on leave for consecutive biennial National Surveys of Physicians in Japan between 1984 and 2004.

3.2. Pattern of female physicians' leave from their work

In the cohort data, 46,561 female physicians were identified. The peak of the average percentage of female physicians on leave was between 7–8 years and 11–12 years after registration according to the categorized registered year, as shown in Fig. 1. The slope and peak of the average percentages of female physicians on leave did not differ by registered year, but the peak year after registration was delayed among those female physicians registered in 1990s. The mean age of female physicians at registration was 26.0 ± 3.5 SD (standard deviation) and was not significantly different between the 1980s and the 1990s. The average rate of return to work after 20 years after registration was 82.5%, and 35.2% worked continuously without leaving.

3.3. Flux and continuity of female physicians in internal medicine, surgery, pediatrics, and obstetrics and gynecology

The number of female physicians who were classified as “newly registered”, “on leave (not registered in any area of practice or registered as ‘a physician not in practice’)” and “return” in the biennial surveys is shown in Fig. 2. Since 1998, the number of female physicians in the “on leave” category has been greater than the number of female physicians in the “return” category. Of those in the “on leave”

Table 1

The number and percentage of female physicians by area of practice in 1984, 1994 and 2004.

Year of the survey	1984	1994	2004			
Number of whole physicians (male & female)	<i>n</i> = 170,469	<i>n</i> = 218,215	<i>n</i> = 256,656			
(Number of female physicians, % female)	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Internal medicine***	6516	8.9	8305	11.8	10,919	14.8
Internal medicine subareas***	352	7.6	1680	9.1	3519	12.5
Pediatrics***	2164	24.3	3608	27.4	4572	31.2
Psychiatry and neurology***	816	11.3	1404	14.2	2315	18.4
Surgery***	189	1.1	479	2.0	1079	4.6
Surgical subareas*	297	2.2	740	3.0	1579	5.0
Obstetrics and gynecology***	1396	10.1	1704	13.9	2695	22.2
Ophthalmology	2516	34.5	3618	36.0	4585	36.8
Otolaryngology	992	14.6	1362	16.3	1667	18.4
Dermatology	908	27.0	1901	29.6	2956	38.0
Rehabilitation medicine [§]	–	–	101	13.3	294	17.3
Radiology**	195	9.1	553	14.6	881	18.4
Anesthesiology***	478	18.8	1047	22.6	1859	29.1
General (rotation)***	70	5.7	60	8.4	1275	32.8
Other***	152	2.9	620	12.5	67	25.4
Unknown***	175	5.1	26	12.0	4729	21.4
Total, % female	17,216	10.1	27,208	12.5	42,035	16.4

Note: Chi-squared test examined the data between 1984 and 2004.

* $p < 0.05$ ** $p < 0.01$.*** $p < 0.001$.

§ Chi-squared test examined the data between 1994 and 2004.

Table 2

The area of practice and percentage of female physicians among young physicians under 29 years old.

Years of the survey	1984	1994	2004		
Number of whole physicians (male & female)	<i>n</i> = 23,791	<i>n</i> = 25,886	<i>n</i> = 25,956		
Number of female physicians, % female	<i>n</i> = 3474	<i>n</i> = 6351	<i>n</i> = 9152		
Area of practice, % female					
Dermatology	41.5	Dermatology	53.2	Dermatology	68.4
Ophthalmology	38.6	Ophthalmology	47.5	Obstetrics and gynecology	66.2
Pediatrics	30.0	Pediatrics	44.1	Ophthalmology	51.5
Anesthesiology	24.8	Obstetrics and gynecology	37.3	Pediatrics	49.2
Otolaryngology	21.5	Anesthesiology	32.4	Anesthesiology	46.8
Psychiatry and neurology	18.5	Psychiatry and neurology	29.9	Rehabilitation medicine	44.2
Radiology	17.0	Radiology	28.3	Psychiatry and neurology	38.7
Obstetrics and gynecology	15.4	Rehabilitation medicine	28.0	Radiology	38.3
Internal medicine	14.7	Internal medicine	26.9	Internal medicine	35.6
Internal medicine subareas	11.7	Otolaryngology	26.6	Otolaryngology	35.6
General (rotation)	9.3	Internal medicine subareas	23.0	General (rotation)	34.8
Surgical subareas	3.8	General (rotation)	17.6	Internal medicine subareas	30.6
Surgery	1.9	Surgical subareas	8.2	Surgery	20.8
Rehabilitation medicine	–	Surgery	6.5	Surgical subareas	15.9

category, the percentage of those who were reported as “a physician not in practice” was 2–3%, whereas the vast majority did not report their working state in any area of practice.

Fig. 3 shows the average flux (change in, return, on leave and change out) and continuity of female physicians using two consecutive NSPs from cohort data of 1984–1994 and 1994–2004 in internal medicine, surgery, pediatrics, and obstetrics and gynecology. The percentage of female physicians continuing in their area of practice has been consistently higher for obstetrics and gynecology (75.7% on average) than for surgery (48.4% on average; minimum 28.4%, maximum 61.7%).

The “change out” percentage was observed to be higher for surgery, while the percentage of “change out” from obstetrics and gynecology to the other areas of practice remained constant at low levels of less than 2%. The per-

centages of flow-in (change in and return) and flow-out (on leave and change out) were relatively stable for internal medicine even though the number of female physicians increased between 1984 and 2004.

In the comparisons between the percentages of female physicians in the “on leave” and “return” groups for the four areas of practice, there was no remarkable difference between the four areas of practice. The overall average percentage of female physicians “on leave” was approximately 10% (internal medicine, 10.6%; surgery, 9.8%; pediatrics, 11.2%; and obstetrics and gynecology 10.8%). The average percentages of female physicians in the “return” group (internal medicine, 9.4%; surgery, 7.1%; pediatrics, 9.2%; obstetrics and gynecology, 8.5%) were approximately 1% lower than those of female physicians “on leave” in all four areas of practice. For pediatrics and obstetrics and gynecology, the percentages of both “change out” and “change

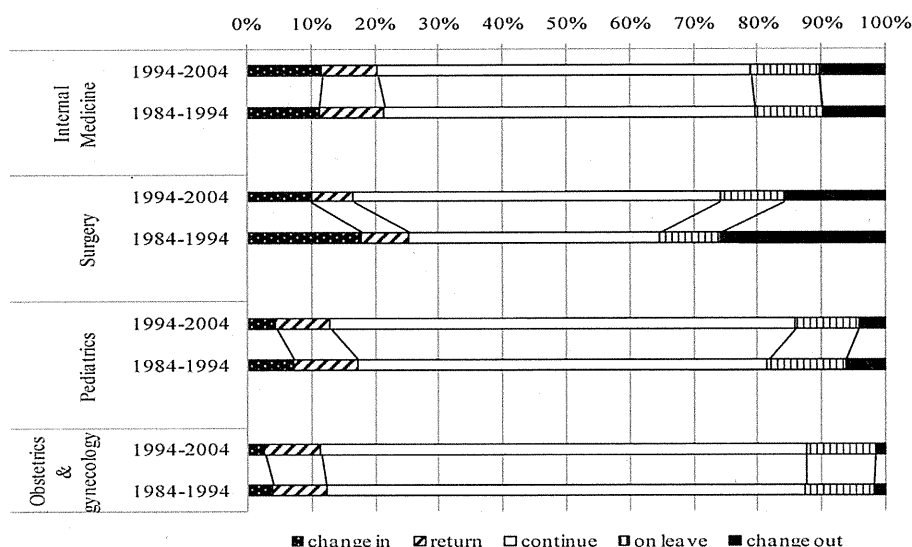


Fig. 3. Average percentage of female physician flux (leave, return, and change in area of practice) and continuity of work from 1984 to 2004. *Note:* The data were obtained from consecutive National Surveys of Physicians between 1984 and 1994 (average of 1984–1986, 1986–1988, 1988–1990, 1990–1992, 1992–1994) and between 1994 and 2004 (average of 1994–1996, 1996–1998, 1998–2000, 2000–2002, 2002–2004) for internal medicine, surgery, pediatrics, and obstetrics and gynecology. Only data for those female physicians with more than 4 years' post-registration experience were used.

in" were less than 5%, values that are lower than those for internal medicine and surgery. Overall, the percentages of female physicians who changed their area of practice ("change in") were, on average, 11.6% for internal medicine; 14.0% for surgery, 6.6% for pediatrics and 3.4% for obstetrics and gynecology. The percentages of those who changed their areas of practice ("change out") were, on average, 10.1% for internal medicine, 20.7% for surgery, 5.0% for pediatrics, and 1.7% for obstetrics and gynecology.

4. Discussion

4.1. Increase in the proportion of female physicians

In 1970, the Japanese government set a target of "securing at least 150 physicians per population of 100,000 by 1985". Since 1973, new medical schools have been established, sharply increasing the number of physicians. The number of medical schools increased to 80 and the number of students to 8360 in 1995, compared with 50 schools and 4380 students in 1970 [21]. The results of this study show that the proportion of female physicians among all newly registered physicians is increasing every year. It was reported that the workforce participation rates of female physicians in their late 20s and 30s have shown a marked decline in Japan, compared to those of male physicians, which have remained at a high level until the age of 65 years [19]. Our study also showed that up to 25% of female physicians leave work after registration. This means that, if the proportion of young female physicians increases in the future, leave-taking by female physicians could seriously affect the total physician workforce. In addition, it was also found in this study that the number of female physicians in the "on leave" category has been greater than the number of female physicians in the "return" category since 1998. Levinson predicted that feminization of the

profession would result in changes in the local and social delivery of care but also stated that the overall size of the effect on the workforce was not yet clear [8]. Koike et al. also hypothesized that the increase in the number of female physicians could impact certain specialties for which the percentage of female physicians was originally small and which both male and female new physicians tend to refrain from choosing [20].

Another Japanese study reported that, of female physicians who were qualified for more than 5 years, 6.5% were on leave and 78.0% had taken a part-time position during child-rearing [22]. These data reflect the fact that many female physicians in Japan do not continue their career full-time. The regulation of working hours and a better understanding of maternity and parental leave by colleagues were reported to be important factors enabling female physicians to continue their careers [9,10]. In addition, with respect to specific support for female physicians' child-rearing, Oki et al. indicated a demand for better access to day care facilities and greater flexibility in caring for their sick children in Japan [23]. Therefore, policymakers should carefully monitor the dynamics of the physician workforce to avoid physician shortages in certain areas of practice and should also consider promoting a supportive working environment for physicians to continue their careers.

4.2. Preference of area of practice by female physicians

In this study, we found that dermatology, ophthalmology, and pediatrics retained high proportions of female physicians, whereas the percentages of female physicians increased for obstetrics and gynecology, anesthesiology, surgery and surgical subareas of practice in Japan. The proportion of female physicians under 29 years old in surgery was 20.8%, which might increase, as in other countries; for example, 32% of surgical in the USA are female [24].

Troppmann et al. emphasized the necessity for strategies to include serious consideration of alternative work schedules and optimization of maternity leave and child care opportunities to maximize the recruitment and retention of female surgeons, even though the survey showed that most female surgeons would choose their profession again [25]. In this study, although there was no information about working hours or the work environment of surgeons, the detailed analysis of the data on changing out in this study suggested that the female surgeons who changed their area of practice to internal medicine (24%) might have worked in an insufficiently supportive environment for them to continue their careers in surgery. Other areas of practice into which surgeons changed were gastroenterology (11.3%), anesthesiology (7.3%), pediatric surgery (7.1%), plastic surgery (6.3%), and cardiovascular surgery (5.5%), in descending order of frequency. Female surgeons continuing to work in a subarea of surgery accounted for approximately one third of surgeons in the “change out” group in this study. Even after subtracting these surgeons, the percentage of “change-out” was higher for surgery than for internal medicine, pediatrics, and obstetrics and gynecology.

4.3. Status of “on leave”, “return” and area of practice “change”

In Japan, it has been pointed out that physicians become exhausted because of the overwhelming workloads. There was a report in Japan blowing a whistle concerning the overworking of obstetricians who were employed by hospitals. These obstetricians frequently worked more than 60 h per week, particularly those physicians who worked in obstetrics and gynecology [26]. However, we observed that the percentages for “change out” and “change in” in obstetrics and gynecology, as well as in pediatrics, were low among female physicians. In addition, the percentage of female physicians in obstetrics and gynecology on leave was not different from that of other areas of practice. This result might indicate that female physicians who prefer to work in the area of obstetrics and gynecology tend to continue their careers. In addition, this study indicated that more young female physicians tend to choose obstetrics and gynecology. Therefore, the necessity of a fundamental review of the working conditions for physicians working in obstetrics and gynecology should be emphasized because both male and female physicians in this area of practice have been required to perform long hours of service.

Recently, in Japan, initiatives such as hiring female physicians part-time or for treating only outpatients have been undertaken to create a better working environment for female physicians with children. Another ongoing countermeasure is the recruitment of female physicians on leave and the creation of a female physician human resource bank by the Japan Medical Association. Certainly, it seems difficult to change the existing working system, which has been built up over a long period of time by huge efforts and personal sacrifices made by physicians, who were almost all male in the past. However, improving working conditions is not only for the benefit of female physicians but for the benefit of male physicians so that all physicians

can continue their careers in balance with their personal lives. In the end, it is necessary to improve the entire working system for physicians, particularly for obstetricians, by introducing a rotation system for night-call in local areas in collaboration with physicians at private clinics, managing several part-time working physicians for the treatment of outpatients, and so forth to reduce the burden of physicians working in hospitals. These steps are applicable for all areas of practice experiencing severe shortages of physicians; another study pointed out that the healthcare organizations should develop new practices for attracting new personnel, including talented management [27].

In recent years, the proportion of female physicians “on leave” remained greater than that of female physicians in the “return” group. This difference could be explained by the fact that the percentage of female physicians of reproductive age increased as the result of the recent increase in the number of newly registered female physicians. Japanese healthcare policymakers should understand the patterns of leave-taking by female physicians and should monitor the active workforce of female physicians, which is always influenced by a variety of factors after qualification, especially personal life events, such as marriage and childbearing. Another study indicated that the ratio of female-to-male practice productivity of obstetrician-gynecologists in 10-year age increments from 30- to 60-year-old individuals revealed lower productivity in many variables for the women in the 40–49 age group [28]. Therefore, a more detailed study including an analysis of working hours and conditions is needed to make the future plan suitable for working female physicians in Japan. Finally, retention after 20 years was approximately 80% among Japanese female physicians; thus, there are still huge human resources available if policymakers wisely plan or promote the careers of female physicians and create appropriate working environments in which female physicians can remain in or return to their careers.

4.4. Limitations of the National Survey of Physicians and future implications

It is mandatory for physicians to submit their form to the NSP, and the overall return rate, considering the survival rate, was estimated to be 90.3% [29]. The approach of using only the NSP data has a limitation in accurately determining the percentages of “on leave” physicians because the surveys are conducted only biennially, and therefore it is impossible to determine the number of short-term leaves, including pregnancy and maternity leaves. Furthermore, as the questionnaire forms are sent to the physicians' workplaces, it is also difficult to determine the status of those working at multiple facilities as part-time employees. To accurately determine the dynamic state of a physicians' work status, the questionnaire forms should be sent to and collected from individuals. Another possible approach would be utilizing the Health Insurance Doctor Registry. In Japan, the Public Health Insurance System is well developed; in this system, all physicians who provide medical services to publically insured individuals are required to register with the administrative office of the Social Insurance Agency. If mandatory and periodic collections of the

questionnaire forms are incorporated into this system, a more accurate determination of the dynamic state of physicians' work status would be possible. At the same time, the collection of information about physicians on maternity leave and parental leave would be desirable.

5. Conclusion

This study showed an increase in the proportion of female physicians in Japan in more recent generations, especially in surgery, surgical subareas of practice, and obstetrics and gynecology. The total number of female physicians' on leave has exceeded the number of female physicians returning to work since 1998, and the percentage of those changing their area of practice was high for surgery and low for obstetrics and gynecology and pediatrics. Leave-taking and returning to work by female physicians could have a great impact on the physician workforce because of the continuing increase in the proportion of young female physicians. These issues should be considered in physician workforce planning along with the implementation of measures to improve the working environment to encourage female physicians to stay in or return to their careers.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

TK conducted the data analysis, literature review and produced the first draft of manuscript. SK, SM and TI participated in the data analysis and the drafting of the manuscript. HI and HY contributed to sorting the original data from the MHLW. All authors discussed the results, commented on the manuscript, and gave final approval.

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References

- [1] Redman S, Saltman D, Straton J, Young B, Paul C, Brundtland GH. Determinants of career choices among women and men medical students and interns. *Medical Education* 1994;28(5):361–71.
- [2] Williams AP. Changing the Palace Guard: analyzing the impact of women's entry into medicine. *Gender, Work and Organization* 1999;6(2):106–19.
- [3] Gjerberg E. Medical women—towards full integration? An analysis of the area of practice choices made by two cohorts of Norwegian doctors. *Social Science and Medicine* 2001;52(3):331–43.
- [4] Heiliger PJ, Hingstman L. Career preferences and the work–family balance in medicine: gender differences among medical specialists. *Social Science and Medicine* 2000;50(9):1235–46.
- [5] Brundtland GH. The woman physician in the year 2000. *Journal of the American Medical Association* 2000;283(1):3–19.
- [6] Riska E. Towards gender balance: but will women physicians have an impact on medicine? *Social Science and Medicine* 2001;52:179–87.
- [7] Hojat M, Gonnella JS, Erdmann JB, Veloski JJ, Louis DZ, Nasca TJ, et al. Physicians perceptions of the changing health care system: comparisons by gender and specialties. *Journal of Community and Health* 2000;25(6):455–71.
- [8] Levinson W, Lurie N. When most doctors are women: what lies ahead? *Annals of Internal Medicine* 2004;141(6):471–4.
- [9] Lyon DS. Graduate education in women's health care: where have all the young men gone? *Current Women's Health Reports* 2002;2:174–9.
- [10] Whitcomb ME. The future of academic medicine has begun. *Academic Medicine* 2004;79(4):281–2.
- [11] The Looming Crisis in the Health Workforce. How can OECD Countries Respond? OECD Health Policy Studies; 2008.
- [12] Ministry of Education, Culture, Sports, Science and Technology (Japan): School Basic Survey 2005. Tokyo; 2005.
- [13] Ide H, Yasunaga H, Koike S, Kodama T, Igarashi T, Imamura T. Shortage of pediatricians in Japan: a longitudinal analysis using physicians' survey data. *Pediatrics International* 2009;51(5):645–9.
- [14] Ide H, Koike S, Kodama T, Yasunaga H, Imamura T. The distribution and transitions of physicians in Japan: a 1974–2004 retrospective cohort study. *Hum Resources for Health* 2009;7(1):73.
- [15] Ide H, Yasunaga H, Kodama T, Koike S, Taketani Y, Imamura T. The dynamics of obstetricians and gynaecologists in Japan: a retrospective cohort model using the Nationwide Survey of Physicians data. *The Journal of Obstetrics and Gynaecology Research* 2009;35(4):761–6.
- [16] Hoya Y, Okamoto T, Yanaga K. Stop the surgeon shortage what could be done and what should be done right now. Series 3: correction of uneven distribution of doctors. *Nippon Geka Gakkai Zasshi* 2008;109(2):115–6 [in Japanese].
- [17] Kimura H, Toga H, Inoue H, Iwanaga T, Kohno N, Hashimoto S, et al. A questionnaire report concerning the actual situation of respiratory physicians in Japan. *Nihon Kokyuki Gakkai Zasshi* 2006;44(4):312–8.
- [18] Koike S, Ide H, Yasunaga H, Kodama T, Matsumoto S, Imamura T. Post-graduate training and career choices: an analysis of the Physicians Survey in Japan. *Medical Education* 2010;44:289–97.
- [19] Kaneto C, Toyokawa S, Inoue K, Kobayashi Y. Gender difference in physician workforce participation in Japan. *Health Policy* 2009;89(1):115–23.
- [20] Koike S, Matsumoto S, Kodama T, Ide H, Yasunaga H, Imamura T. Estimation of physician supply by specialty and the distribution impact of increasing female physicians in Japan. *BMC Health Service Research* 2009;9(180). doi:10.1186/1472-6963/9/180.
- [21] Nakaya H. Josei ishi no suii to genjo [Trend and current status of female physicians]. *Igaku-Kyoiku* 1985;16:8–13 [in Japanese].
- [22] Yamazaki Y, Marui E. An alumna survey of female physicians. *Jun-endo Medical Journal* 2009;55(2):142–7 [in Japanese].
- [23] Oki I, Ojima T, Uehara S, Kurasawa M, Niwa H, Niwa M, et al. Josei ishi no Ikuji tonon Ryoritsu ni hitsuyona shien ni kansuru kenkyu [Support systems for childcare of female physicians]. *Igaku-Kyoiku* 2003;34:343–8 [in Japanese].
- [24] Women in U.S. Academic Medicine: Statistics and Benchmarking, 2008–2009. Association of American Medical Colleges.
- [25] Troppmann KM, Palis BE, Goodnight Jr JE, Ho HS, Troppmann C. Women surgeons in the new millennium. *Archives of Surgery* 2009;144(July (7)):635–42.
- [26] Survey of Physician Workload Related to Physician Workforce. Ministry of Health, Labour and Welfare, Japan. February 2006. [in Japanese] <<http://www.mhlw.go.jp/shingi/2006/03/s0327-2c.html>>.
- [27] Heilmann P. To have and to hold: personnel shortage in a Finnish healthcare organisation. *Scandinavian Journal of Public Health* 2010;38(July (5)):518–23. Epub 19 May 2010.
- [28] Benedetti TJ, Baldwin LM, Andrilla CH, Hart LG. The productivity of Washington State's obstetrician–gynecologist workforce: does gender make a difference? *Obstetrics and Gynecology* 2004;103(March (3)):499–505.
- [29] Shimada N, Kondo T. Estimation of actual report rates using data from the survey of physicians, dentists and pharmacists. *Nippon Kosu Eisei Zasshi* 2004;51:117–32.

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