



American Academy of Orthopaedic Surgeons

Orthopaedic Practice in the US 2005-2006 Final Report

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Summary

Information presented in the 2006 Orthopaedic Practice in the US (OPUS) is based on an expanded membership category from that of previous years. In the past, only board certified Active Fellows were included. With the inclusion of Candidate/Applicant, Non-Members, and practicing Emeritus Members, the 2006 report is more representative of the US orthopaedic workforce. In addition, members who responded to the AAOS member census in 2004 but did not respond in 2006 have been included in this report on the belief that members may not respond every two years due to minimal change within their practice. Analysis of differences between the 2006 and 2004 respondents did not show substantive differences in response groups.

The OPUS report includes member information on 63% of active members, and 74% of member Fellows, who are board certified orthopaedic surgeons practicing in the United States. The 54% response rate to the 2006 AAOS Member Census was slightly lower than in 2004. Three-fourths (76%) of the 13,679 members included in the analysis responded in 2006. Surgeons working in a part-time capacity represent 11% of the total workforce. Key findings of the 2006 orthopaedic workforce characteristics are as follows. Comparison of findings to previous years' OPUS reports is limited due to changes in the analysis group.

- The orthopaedic surgeon workforce shows greater diversity among its younger members than is found overall. Females represent only 3% of the total workforce, but 6% of the Candidate/Applicant members. However, their representation is stronger among surgeons between the ages of 35 and 39 than is found in surgeons under the age of 35. Among the total orthopaedic workforce, minorities make up 10% of practicing surgeons; among the candidate/ applicant member groups, minorities represent 18% of orthopaedic surgeons. Asian Americans remain the largest minority group. Female orthopaedic surgeons are more racially diverse than males.
- The orthopaedic workforce continues to age as surgeons under age 40 comprise less than 15% of all members. A large cohort of surgeons who entered the workforce in the early 1990s is slowly moving through. In addition, the proportion of surgeons who remain active past the age of 70 maintained its slow rise and represented 5% of the total orthopaedic workforce in 2006.
- The density of orthopaedic surgeons in most states declined (fewer surgeons per 100,000 populations) since the 2004 computation, in spite of the addition of 500 doctors. This is primarily due to population increases recorded in the July 2005 US census estimates.
- ABOS re-certifications took a substantial jump in 2005, with 670 surgeons reporting they received their re-certification. A certification in hand surgery is held by 8% of the workforce, while 22% report the hand as a specialty area.
- The shift to specialization seen in the past 16 years stabilized in 2006, with the distribution of orthopaedic surgeons between generalist (29%), generalist with a specialty (32%) and specialist (39%) essentially unchanged from 2004.
- The top five areas of practice focus remain unchanged. With the exception of sports medicine, the third place specialty area, the remaining four top specialties focus on joint replacement and arthroscopy. Added to the specialty list in 2006 was total joint, now in seventh place. Variation in availability from the overall US distribution of orthopaedic specialists shows pockets of the country where greater than $\pm 10\%$ of specialists in a surgical area are located. The region with the greatest variation is the West North Central division.
- Private practice continues to make up the majority (81%) of orthopaedic practice settings. The remaining 19% is split between seven additional practice settings. In 2006, private Academic practice, as opposed to institutional Academic practice, was included in the list. Although only a small group of surgeons (2%), this group of orthopaedic surgeons reported some of the highest mean times spent in CME and professional meeting activities, as well as being one of the highest paid practice settings.
- Two out of five (42%) orthopaedic surgeons hold an academic/teaching appointment. The majority of this group (74%) are non-salaried, adjunct instructors. Nearly all full-time salaried orthopaedic surgeons in academia (85%) are specialists. This proportion decreases to 49% among adjunct academicians.

- The top ranking fellowship continues to be in sports medicine, comprising 28% of all members with reported fellowships. Hand and spine surgery remain the second (20%) and third (14%) most frequently identified fellowship areas. Several new areas of fellowship were identified by a small group each from the open 'other' category. These are arthroscopy, biomechanics, microsurgery, and rehabilitation.
- One in ten orthopaedic surgeons reported receiving basic or clinical research funding within the past five years. The median age of research-funded surgeons is nearly three years younger than the overall orthopaedic workforce. Ninety percent (90%) of researchers received funding for six or fewer projects. Although orthopaedic specialists represent only 39% of the total workforce, they represent 81% of surgeons receiving funding.
- Since 2004, the mean number of hours worked per week has not increased. Surgeons in an academic practice setting work the longest week, at 66 hours or more, while surgeons in a pre-paid plan/HMO practice report the shortest week at 54 hours. Unlike in past years, the number of hours reported worked correlated with a higher income, with the exception of surgeons in institutional academic settings. Two in three take trauma call, but only 25% of this group receive compensation for trauma call.
- The average orthopaedic surgeon spends four weeks a year on vacation. The number of days spent at CME events and professional meetings varies substantially by practice setting, with surgeons in a military setting spending the least days (7.7 CME and 6.7 meetings), while surgeons in a private academic setting spend the most (11.4 CME; 13.6 meetings).
- On average, full-time practicing orthopaedic surgeons spend 86% of their time in clinical practice, including surgery, patient rounds, and office practice. The proportion of time spent in teaching is highest for private and institutional academic surgeons (14%). Military orthopaedic surgeons spend the most time in administrative tasks (19%). Research remains only 2% of total orthopaedic surgeon time allocation, and is reported in significant proportion (50% or more) by only 22 members.
- Patient mix by payor source for orthopaedic surgeons remains virtually unchanged from 2004, with managed care (HMO and PPO) and Medicare/Medicaid each representing about one-third of total payor sources. Approximately 4% of total surgeon care was classified as pro bono by respondents; surgeons between the ages of 40 and 49 are most likely to provide this service. Workers' compensation accounted for nearly 12% of total payment for orthopaedic services.
- Orthopaedic surgeons perform an average of 32 orthopaedic procedures each month. Only minor variations in this average were found between different groups of surgeons. Among twelve frequently performed procedures, arthroscopy of the knee was reported by a higher number of surgeons than other procedures, and with greater frequency. Spinal disc replacement procedures were reported by 245 surgeons doing an average of more than four replacements per month.

Introduction/Rationale

This report is the 12th in a series produced by the American Academy of Orthopaedic Surgeons® (AAOS) to focus on the practice of orthopaedics and the orthopaedic workforce in the United States. Since 1988, every two years the AAOS asks all members to complete a questionnaire on the characteristics of their orthopaedic practice. The information received updates the AAOS member database, and is reported in the Orthopaedic Practice and Income in the US (OPUS) report found here.

In 2004, the American Medical Association identified 23,796 orthopaedic surgeons in practice in the US. Information in this report is based on the most recent survey results of 24,015 AAOS members living in the US or its territories at the time of the survey.

Response and Methodology

The overall response rate to the 2006 AAOS Member Census was 53.6%, reflecting a continuing downward trend over the past 12 years in member response to this important data collection tool. Members received a minimum of three personal requests by fax, email or letter to participate in the census. In addition, postings of numerous reminders in AAOS print and electronic newsletters asked members to complete and return their census questionnaires. Members could respond online, by fax, or by mail.

In reporting the 2006 orthopaedic workforce characteristics, significant changes in the sampling strategy occurred. Previous OPUS reports included only board certified practicing orthopaedists who were members of the Fellows category. AAOS membership includes eight member categories, of which two relate to Residents only. In 2006, it was determined the remaining six membership categories, in actuality, represent the full orthopaedic workforce; this report is based on 13,679 board certified, actively practicing orthopaedic surgeons in the US, of which 12,076 are Fellows. The remaining members are Candidate/Applicant Members, Non-Member Practicing Orthopaedic Surgeons, and Emeritus Members.

In addition, some members do not participate in each biannual census because their practice statistics have not changed since the previous census. For that reason, it was determined the inclusion of members from the six non-Resident member categories who responded to the 2004 census, but did not respond in 2006, in the analysis sample was appropriate. Among the 13,679 respondents included in the analysis, 76% responded in 2006.

The final OPUS sample represents 63% of board certified members in the six member categories included, and 74% of members in the Fellows category. Because of the changes in the OPUS sample described above, direct comparison to previous OPUS reports is limited. The response rate for members in individual states ranged from a high of 80% in Arkansas to a low of 50% in Virginia.

The AAOS Member Census data collection process includes all members. As a result, calculation of confidence intervals and margin of error in responses, which are based on random samples of a larger population, are not applicable. However, the large number of members upon which this information reports provides a solid indication of the true demographics of the orthopaedic surgeon population. As an example, a random sample with a 99% confidence level and a $\pm 2\%$ error for the full AAOS membership would have required 3,546 responses. Our sample is more than four times this size.

A detailed discussion of the sampling and other methodological issues is presented in the Methodology section of this report.

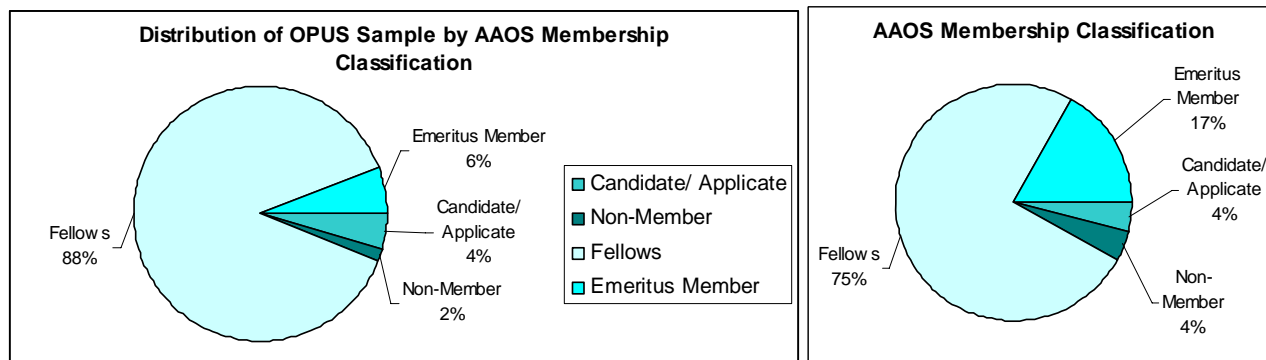
Survey Findings

Orthopaedic Workforce Characteristics

Demographic characteristics of the orthopaedic workforce include all board certified orthopaedic surgeons as of June 1, 2006. Comparison of the OPUS sample to the overall orthopaedic workforce identifies differences that might occur between respondents and the total workforce.

AAOS Membership Classification

For the first time, the 2006 OPUS report incorporates respondents from all categories of the available and actively practicing orthopaedic workforce. Past OPUS reports have included only those members who are currently active Fellows. With the exception of the inclusion of a small group (n=238) of orthopaedic surgeons who are not currently members of AAOS, the membership groups follow general age categories of early practice years (Candidate/Applicant members), prime practice years (Fellows), and semi-retirement practice years (Emeritus members). While 88% of respondents are in the Fellows membership classification that constitutes the full sample of previous OPUS reports, the addition of other member classifications presents a more representative look at the orthopaedic workforce. In particular, it is important to find that 19% of Emeritus members who responded to the 2006 census continue to practice orthopaedics in some capacity.



Gender

AAOS began tracking the gender of orthopaedic surgeons in 2000. Females represent 3.0% of the current board certified orthopaedic workforce, but represent 6.6% of the OPUS respondents. Females responded to the 2004 census in higher proportion than to the 2006 census; hence, 61% of the female respondents are from the 2004 sample.

The proportion of females in the orthopaedic workforce rises as the age cohort declines. Membership classification is highly correlated with age. Among Candidate/Applicant members, 6.1% are female, compared to 3.5% of Fellows and 0.5% of Emeritus members. By age, the highest proportion of female orthopaedic surgeons, 5.7%, are under age 40. However, the 24 to 34 year old members include a lower proportion of females than is found between the ages of 35 and 39 (4.2% to 5.8%, respectively).

US Orthopaedic Workforce by Gender and Member Classification

	<u>Candidate/ Applicant for Fellowship Member</u>	<u>Non-Member Orthopaedic Surgeon</u>	<u>Fellows</u>	<u>Emeritus Member</u>	<u>TOTAL by GENDER</u>
Female	6.0%	2.1%	3.5%	0.5%	3.0%
Male	93.7%	97.4%	96.4%	99.4%	96.9%
Unknown	0.2%	0.2%	0.1%	0.1%	0.1%
TOTAL N in Member Group	822	895	16,201	3,748	21,666

OPUS Sample by Gender and Member Classification

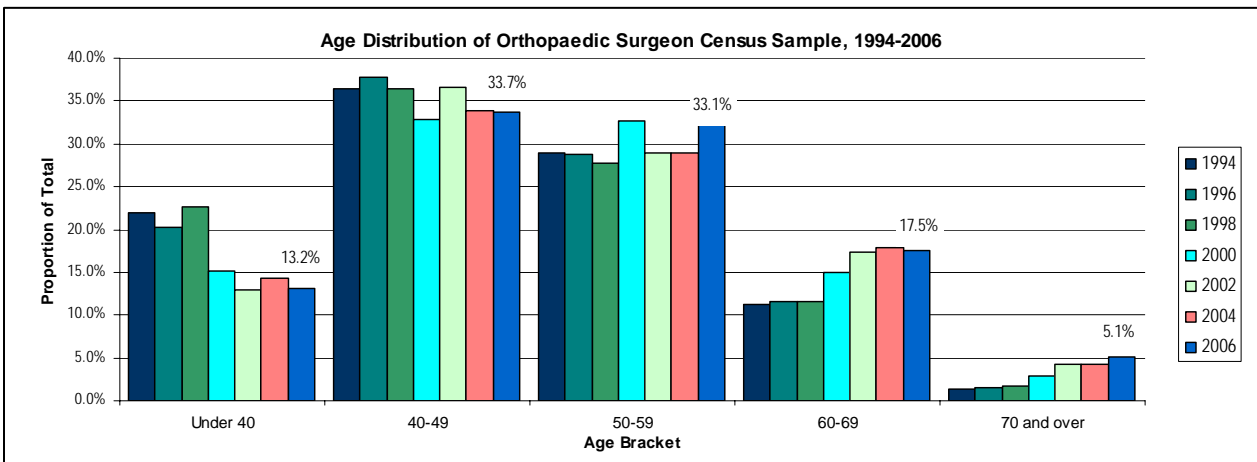
Female	30.0%	33.6%	5.3%	0.5%	6.6%
Male	66.8%	66.4%	94.6%	99.5%	93.3%
Unknown	0.2%	0.0%	0.1%	0.0%	0.1%
TOTAL N in Member Group	600	238	12,056	785	13,679

Age

The average age of practicing orthopaedic surgeons in the OPUS sample is 51.4 years, and ranges from 31 years to 92 years. The mean age of the OPUS respondents for the past two census periods was approximately 6 months younger, at 50.9 years. Sample changes that include older orthopaedic surgeons in the Emeritus member category may explain this change; however, the inclusion of younger orthopaedic surgeons who are candidate or applicant members provides an offset. The mean age of all members in the six membership categories from which the workforce is drawn is 54.7 years, reflecting the inclusion of older members who have retired from active practice.

The median age, or the point at which half the orthopaedic surgeons are younger and half are older, has not changed for the past several census rounds and remains at 50 years of age.

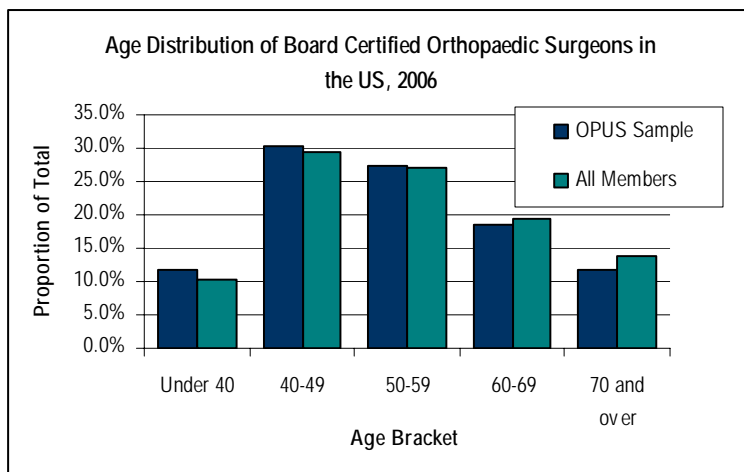
The distribution of respondents to the biannual AAOS member census reflects the overall age cohorts of the orthopaedic workforce. Over the past twelve years, a gradual aging of the workforce population has occurred. In part, this may be due to the longer work life as health status improves and life expectancy increases. Variations in the respondent population also account for some of the distribution differences.



The mean age of the orthopaedic workforce by state ranges from a mean of 48.1 years in Nebraska to 54.3 years in New Mexico. Ten states (Nevada, Colorado, Indiana, Illinois, Idaho, Wisconsin, North Dakota, Montana, South Dakota, and Nebraska) have an orthopaedic workforce with a mean age under 50 years. At the other end, five states (Massachusetts, West Virginia, Maine, California, and New Mexico) and the District of Columbia have an orthopaedic workforce with a mean age of nearly 54 or higher.

Shifting of the orthopaedic workforce, or the entrance of younger surgeons in some states in higher proportions than other states, appears to be occurring as the relative positions of the states with respect to a younger workforce age seems to change with each census. This is less true for states reporting an older orthopaedic workforce.

A comparison of all ABOS certified orthopaedic surgeons in the workforce and the respondents to the 2006 census shows a very similar distribution by age group. Both groups include non-practicing (i.e., retired) orthopaedic surgeons.



Race

AAOS did not begin collecting data on race until the 2004 member census. The discussion below includes all known information related to race in the orthopaedic workforce. In 2004, this information was based on 10,441 orthopaedic surgeons. In this report, race data is based on 13,066 orthopaedic surgeons.

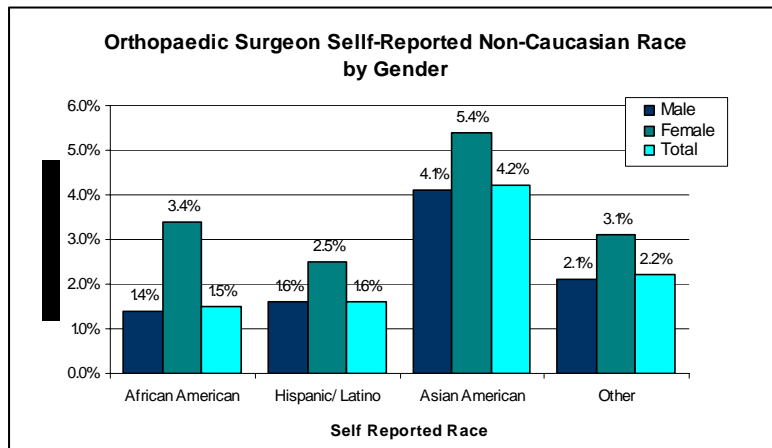
In 2006, the overall proportion of orthopaedic surgeons who are Caucasian decreased slightly from the 2004 reporting population, and represents more than 90% of the orthopaedic workforce. The diversity of the workforce, however, is greater among some subsections of orthopaedic surgeons than is found overall.

Age, which correlates strongly with membership classification, is one factor. Gender is another. The highest proportion of orthopaedic surgeons of non-Caucasian race, nearly 16%, occurs among the under 40 age group. Current AAOS membership shows those of Asian American heritage to have the highest representation.

	<u>Candidate /</u>				<u>Total</u>
	<u>Applicant</u>	<u>Non-Member</u>	<u>Fellows</u>	<u>Emeritus</u>	
Caucasian	81.7%	86.0%	90.8%	91.9%	90.5%
African American	2.4%	3.5%	1.5%	0.4%	1.5%
Hispanic/Latino	3.4%	1.2%	1.5%	1.8%	1.6%
Asian American	8.5%	5.2%	4.1%	4.0%	4.2%
Other	3.9%	4.1%	2.1%	1.9%	2.2%
Total N	378	172	11,759	757	13,066

Female orthopaedic surgeons report higher proportions of non-Caucasian representation than do males in all racial groups.

Orthopaedic Surgeon Self-Reported Race by Age Group						
	(n=13,066)					
	<u>Under 40</u>	<u>40 to 49</u>	<u>50 to 59</u>	<u>60 to 69</u>	<u>70 and Over</u>	<u>Total</u>
Caucasian	84.2%	90.5%	92.8%	90.3%	93.5%	90.5%
African American	1.4%	2.0%	1.2%	1.4%	0.6%	1.5%
Hispanic/Latino	2.0%	1.8%	1.4%	1.1%	1.8%	1.6%
Asian American	9.5%	3.8%	2.5%	4.8%	2.4%	4.2%
Other	2.9%	1.9%	2.1%	2.4%	1.8%	2.2%
Total N	1,594	4,453	3,969	2,311	674	13,066



Orthopaedic Surgeon Density

A frequent question asked of the AAOS is the density of orthopaedic surgeons by location. Several estimates of this number exist from a number of sources, but the information included in this report is based on AAOS membership for board certified orthopaedic surgeons practicing in the US.

The calculated density of orthopaedic surgeons in the US in 2006 is 6.1 per 100,000 population. This slight decline from 6.2 per 100,000 populations in 2004 is the result of increased population estimates. The 2004 density calculation used the 2000 population from the US Census of Population and Housing, while the 2006 density is based on the Census Bureau's estimated population as of July 1, 2005. Since 1990, the density of ortho surgeons has increased from 5.3 to 6.1, holding relatively steady at this level since 2002.

The number of certified orthopaedic surgeons in the US rose slightly, from 17,486 in 2004 to 17,975 in 2006. These numbers include non-practicing (i.e., retired) orthopaedic surgeons as well as practicing ortho surgeons.

The table below shows states with the greatest change in density of ortho surgeons.

Change in Orthopaedic Surgeon Density 2004 to 2006

(per 100,000 population based on AAOS membership records and
US Census population estimates)

<u>State</u>	<u>Increase in Density</u>	<u>State</u>	<u>Decrease in Density</u>
Wyoming	1.2	Nevada	-0.9
North Dakota	0.7	Virginia	-0.7
Hawaii	0.6	Georgia	-0.6
Massachusetts	0.3	Utah	-0.6
Maine	0.3	North Carolina	-0.6
		Alaska	-0.6

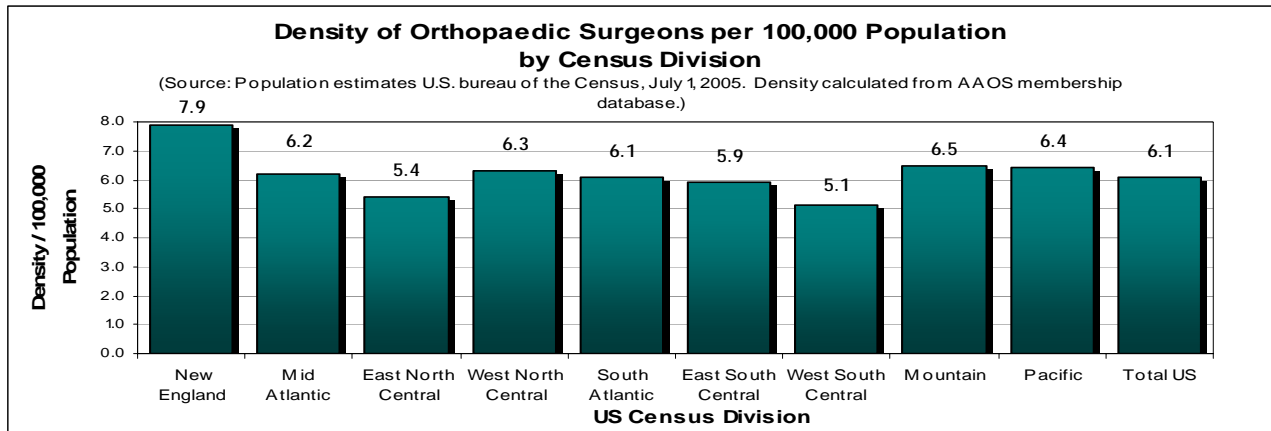
All states show an increase in population from 2000 to the 2005 US Census estimate. However, some states show a loss in the number of orthopaedic surgeons even though the relative density remained constant. Orthopaedic surgeon count includes candidate members and active fellows in 2004. In 2006, it also includes non-members and Emeritus members known to be actively practicing from their response to the 2006 census. Hence, a decline in the number of orthopaedic surgeons in 2006 from 2004 is based on a slightly broader definition of the workforce, and may imply an even greater change than shown. States with a decline in the number of orthopaedic surgeons include:

- Virginia — loss of 17
- Illinois – loss of 8
- North Carolina – loss of 6
- Georgia – loss of 5
- Louisiana – loss of 5 (pre-Katrina)
- West Virginia – loss of 5

States showing a substantial increase in the number of orthopaedic surgeons include:

- California – increase of 113
- Texas – increase of 52
- New York – increase of 44
- Florida – increase of 33
- Michigan – increase of 29
- Massachusetts – increase of 24
- Washington (state) – increase of 24
- Colorado – increase of 23
- Pennsylvania – increase of 21

The US Census of Population and Housing identifies nine divisions, or groupings of states (listed in Appendix B). Comparing the orthopaedic surgeon density by census division, the New England states, as in past years, and despite declining density in two of the four states, has the highest density with 7.9 surgeons per 100,000 persons. The lowest density continues to be in the West South Central states of Arkansas, Louisiana, Oklahoma, and Texas, even though Texas recorded a sizable increase in total number of orthopaedic surgeons.

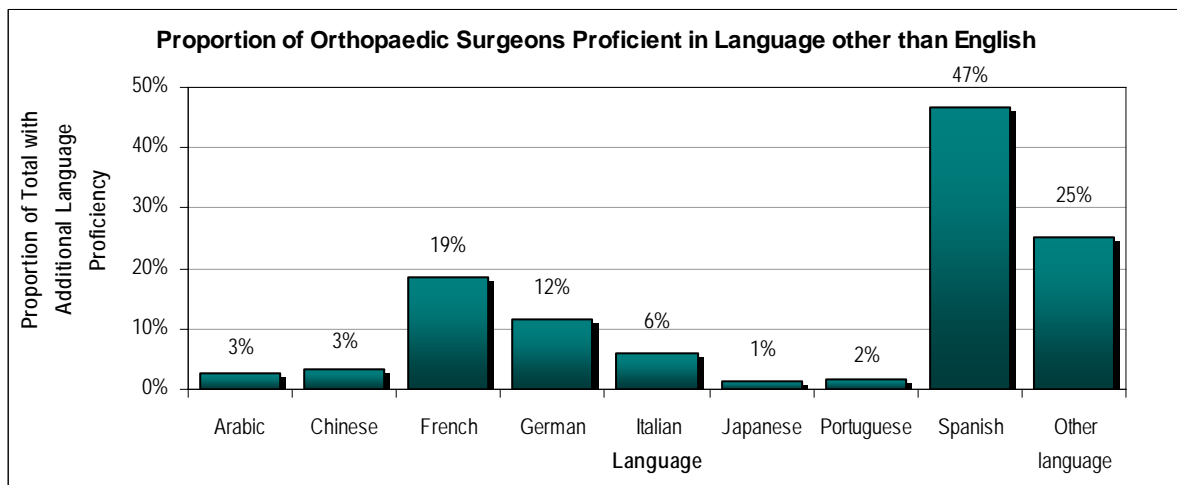


Appendix C includes tables with information on the orthopaedic surgeon density status of all states.

Language Fluency

Approximately one in five (19%) orthopaedic surgeons report fluently speaking a language other than English. Among this group, 15% are fluent in more than one language.

The most frequently spoken language, in addition to English, is Spanish, identified by 47%. In addition to Spanish, other frequently spoken languages include French (19%), German (12%), and Italian (6%).



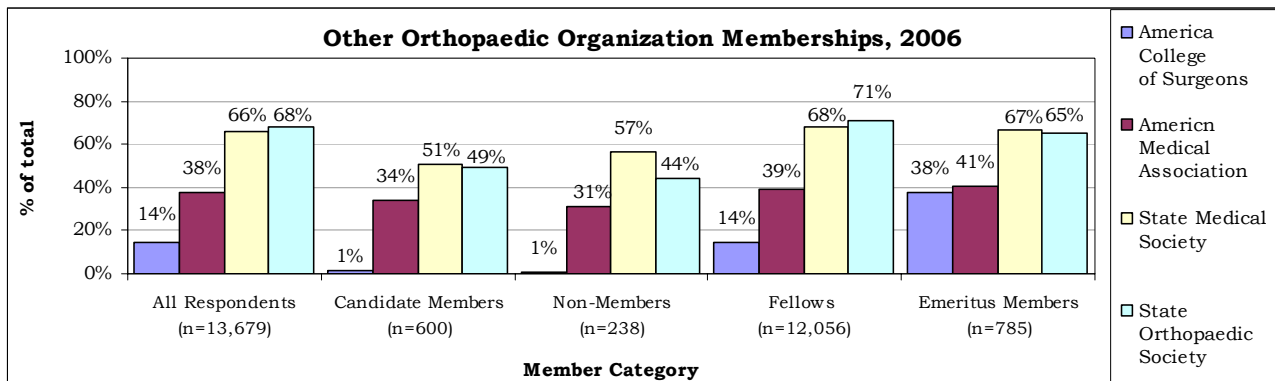
One in four respondents speaking another language submitted a language in open-ended format. More than 40 languages were included. Among these, the most frequently identified were Indian dialects (n=170), including Hindi, Gujarati, Swahli, Punjabi, Marathi, Urdu, Telugu, Tamil, Kannada, and several others. Other frequently identified languages were Hebrew/Yiddish, Greek, Farsi, Korean, Russian, Persian, Armenian, Hungarian, Filipino/Tagalog, and Polish. Languages included in the open response are listed in Appendix D, Open Responses.

Orthopaedic Society Memberships

Reported membership in four orthopaedic societies other than AAOS reflects the same level of membership found among all Fellows in 2004. The highest level of membership in other societies remains with the state level societies, with membership in their State Medical Society reported by 66% of respondents and membership in their State Orthopaedic Society reported by 68% of respondents. As might be expected, membership levels among candidate members and non-members are somewhat lower than among Fellows and Emeritus members.

Membership in the American College of Surgeons remains low at 14% of respondents, but is much higher — 38% — among Emeritus members.

Membership in the American Medical Association (AMA) captures about one-third of AAOS members across all membership categories.

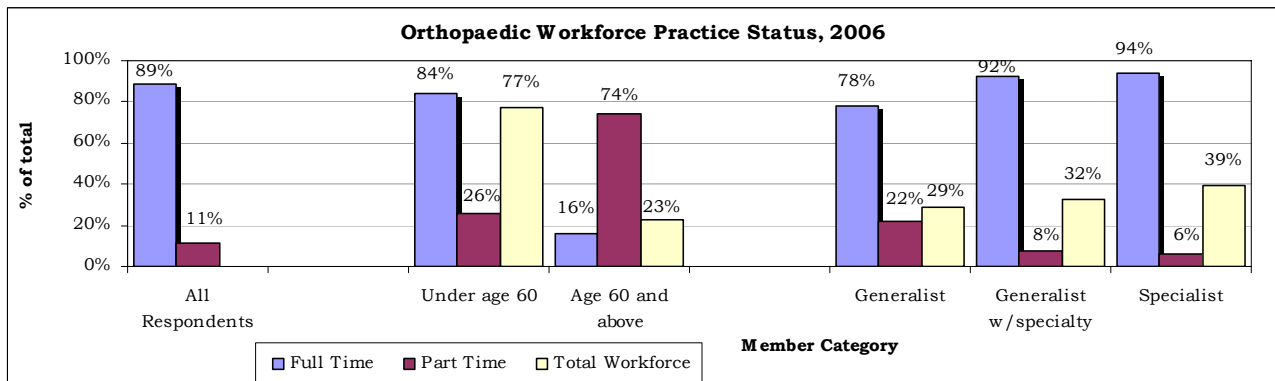


Work status (full or part time) and degree of specialization have no significant bearing on membership in medical associations other than AAOS.

Professional Status

Current Work Status

Slightly more than one in ten surgeons (11%) in the orthopaedic workforce is currently working part-time in the practice of medicine. The mean age of members of the full-time workforce is 49.8 years, while the mean age of the part-time workforce is 64.2 years.

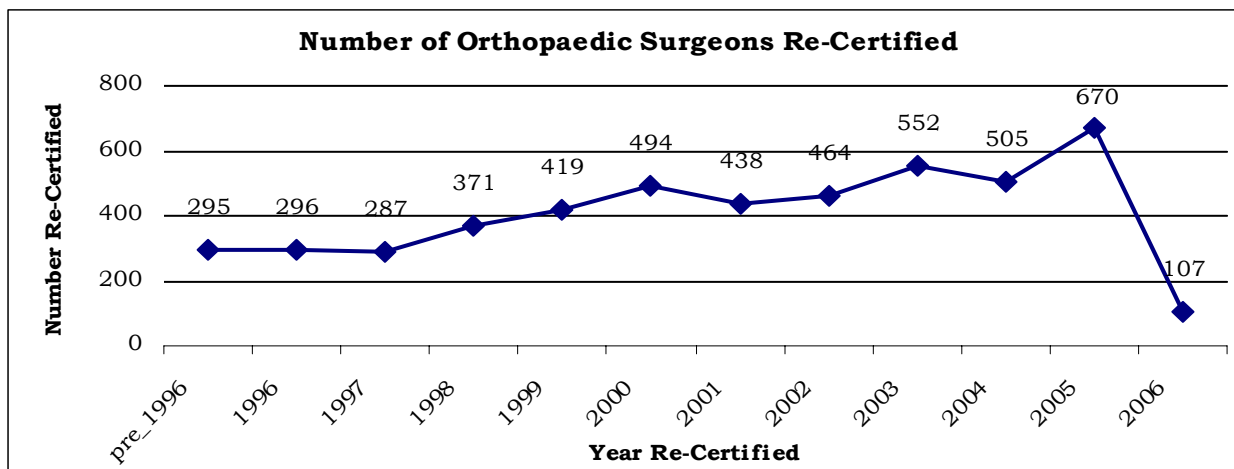


General orthopaedic surgeons are found at a higher than expected proportion of the part-time orthopaedic workforce, reflecting the slightly older age of generalist segment of orthopaedic workforce.

Certification

All members included in this report have board certification to practice orthopaedic surgery. The year of certification is part of the AAOS member records. The year of member certification ranges from 1949 to 2005, with 15% certified earlier than 1976. With the exception of a small drop in the number of currently practicing orthopaedic surgeons certified in 1982 and 1983, between 2.4% and 3.6% of respondents received their certification in any given year.

Nearly one in three (29%) practicing orthopaedic surgeons report they have been re-certified. Nearly all (94%) reported re-certification within the past 10 years. The trend in the proportion of orthopaedic surgeons receiving re-certification shows an annual increase, with the exception of 2006 due to census data collection for the first quarter only.

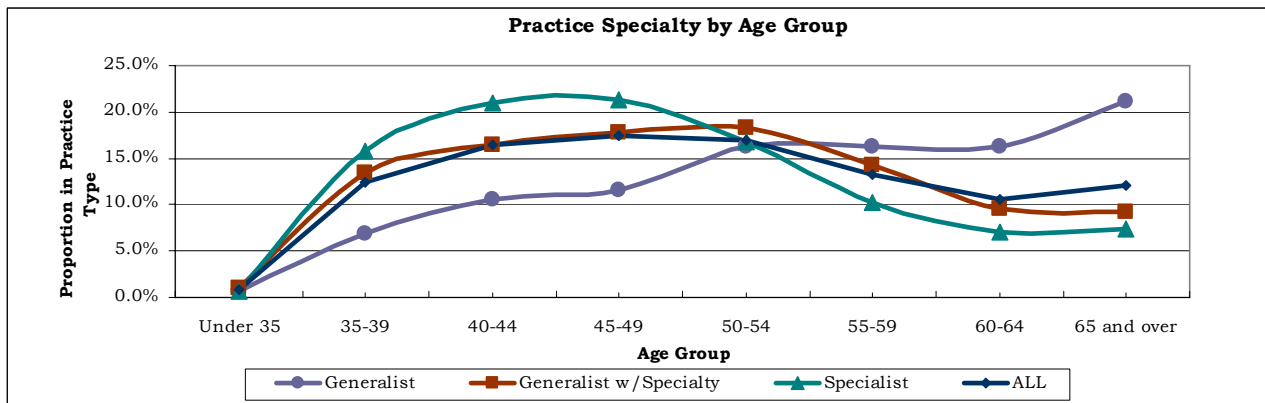
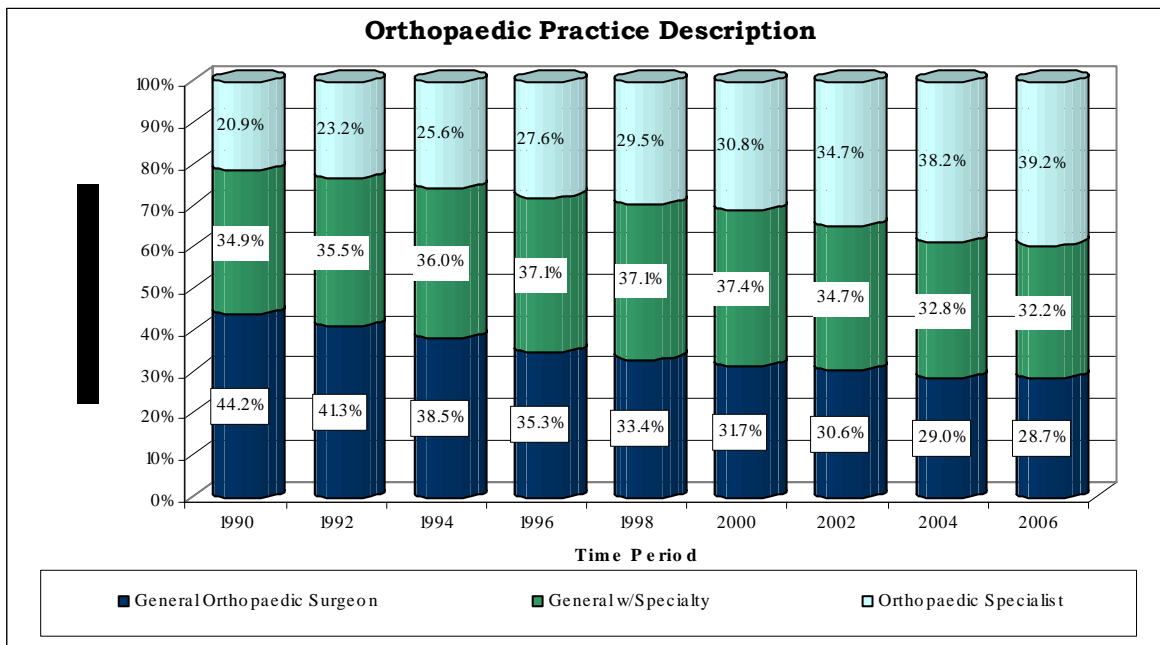


One in twelve (8%) orthopaedic surgeons in the response group holds a subspecialty certificate in hand surgery. This is approximately one-third of the members reporting a specialty or focus in hand surgery. However, 83% of surgeons who are generalists with a specialty interest and 95% of specialists in hand surgery hold the subspecialty certification. Fifty percent (50%) of members receiving their hand certification have done so since 2000.

General Orthopaedic Surgery vs. Specialization

The shift from general orthopaedic focus towards specialization continues the trend observed since 1990; however, it is less dramatic than seen in previous two-year periods. General orthopaedic surgeons with a specialty have remained the most constant segment, with the majority of the shift from generalist to specialists. Only about 1 in 4 orthopaedic surgeons (28%) now report they practice general orthopaedic surgery.

The mean age of orthopaedic surgeons in the three practice types was $\frac{1}{2}$ year older or less for all three groups. However, the distribution by age group continues to show a significant bubble in specialists for younger orthopaedic surgeons, while the trend line for age distribution of generalists continues to rise. Generalists with a specialty reflect the overall age distribution.



Practice Focus

Respondents were asked to identify all areas of orthopaedic surgery they considered their primary or specialty area(s). Respondents identified between none and 17 of the 17 areas. An 18th area, 'non-surgical office practice' was added after reviewing the number of write-ins in the 'other' category. Generalists who indicated none of the areas were back-filled to the 'general orthopaedics' specialty area.

One in four respondents (26%) identified only one area of specialty, while one-third (33%) reported more than four areas of specialty. To help identify patterns of true specialty and commonality in specialties, analysis of respondents reporting between one and four specialty areas is included.

The top five areas of practice remain unchanged from previous years; however, each represents a slightly smaller proportion of orthopaedic surgeons, most likely because of the expanded workforce sample. With the exception of sports medicine, the top five areas of specialty focus on joint replacement and arthroscopy. The addition of total joint, previously found as a write-in focus area, and the seventh most frequently identified focus area (30%), rounded out the joint replacement specialty areas.

The proportion of the orthopaedic workforce identifying the remaining areas of focus dropped more dramatically than the top five. For example, in 2004, a focus in trauma care was identified by 37% of the workforce; in 2006, the proportion was 10% lower at 27% of the workforce. It is unlikely that sampling resulted in this large of a change and likely that other forces are at play.

Other focus areas with more dramatic change in the number of orthopaedic surgeons identifying them as an area of focus are hand (dropped from 28% to 22%); foot and ankle (26% to 19%); pediatric orthopaedics (16% to 11%); pediatric spine (7% to 5%); disability (12% to 10%); and rehabilitation (5% to 2%).

The most frequently identified single area of focus in orthopaedic surgery is the hand, with 20% of the workforce identifying this as their sole focus areas. Hand is closely followed by the adult spine, with 18% of the workforce selecting it as a single focus of their practice. As the number of specialty or focus areas increases, selection of the top five to six areas becomes common. Among members with four identified areas of focus, the adult knee is identified by 79%.

The mean age of specialists for an area is a reflection of future availability of specialists in this area. With five exceptions, the mean age of orthopaedic surgeons for each area of focus was within ± 1.7 years of the overall mean workforce age of 51.4 years, indicating a distribution across the workforce. The only focus area to be significantly younger than the overall workforce is sports medicine, where the mean age of specialists is 49 years. The four older than average specialties are generally the focus of non-surgical practice among the older workforce.

General orthopaedics, as discussed previously, is not as common among younger orthopaedic surgeons, hence the average age of generalists is rising. Three areas of focus are primarily the purview of older orthopaedists who no longer have a surgical practice. These are rehabilitation/prosthetics/orthotics (mean age of 56.8), disability/legal orthopaedics (59.4), and non-surgical office practice (mean age 66.7).

Distribution of Orthopaedic Surgeons by Specialty Area(s) and Mean Age of Surgeons with Specialty

	All Respondents (n=13,679)	Number of Focus Areas Identified				Mean Age of Specialists total =51.4
		1 (n=3505)	2 (n=2329)	3 (n=1651)	4 (n=1394)	
Adult knee	49.3%	1.5%	15.9%	50.0%	79.4%	52.0
Arthroscopy	47.4%	1.3%	16.6%	53.4%	74.1%	50.7
Sports medicine	40.9%	9.6%	22.1%	37.9%	52.7%	49.1
Adult hip	39.4%	0.5%	12.2%	37.1%	40.9%	52.6
Shoulder and elbow	36.0%	3.4%	16.4%	32.0%	43.0%	50.1
General orthopaedics	30.8%	18.9%	22.0%	13.8%	17.6%	55.1
Total joint	29.7%	1.7%	3.9%	25.9%	33.3%	52.0
Trauma	27.1%	5.4%	10.3%	13.4%	18.7%	50.3
Hand	22.3%	19.8%	15.4%	11.1%	30.0%	51.1
Foot and ankle	18.9%	9.1%	5.9%	4.0%	6.0%	52.1
Adult spine	14.8%	17.5%	15.5%	8.1%	7.7%	53.1
Pediatric orthopaedics	10.9%	5.7%	11.6%	5.5%	4.2%	52.1
Disability/legal orthopaedics	9.9%	2.1%	8.6%	5.1%	6.8%	59.4
Pediatric spine	4.9%	0.3%	17.0%	4.6%	2.7%	50.1
Rehabilitation/prosthetics/orthotics	2.3%	1.0%	0.6%	1.0%	0.9%	56.8
Orthopaedic oncology	2.1%	2.0%	0.9%	1.2%	1.4%	51.1
Non-surgical office practice	0.8%	0.5%	2.7%	1.0%	0.4%	66.7
Other focus area	3.0%	0.5%	2.6%	1.6%	1.8%	53.9

Focus Area by Geographic Location

Actual density of orthopaedic surgeons by specialty comparable to that of overall density is not available as data on areas of focus is not available for all members. However, looking at the geographic distribution of the workforce with known specialties offers some indication of areas of need. To identify areas where the availability of orthopaedic specialists may be higher or lower than found in the US overall, the percentage of respondents selecting each specialty was calculated for each geographic division. This proportion was then compared to the US, and a ratio of the two numbers created. The difference in the geographic ratio and 100% (equal to the US distribution) was computed. Many factors impact on the variation and need for orthopaedic surgeons within specialty areas, and this information should be taken into consideration with these other factors.

The distribution of orthopaedic surgeons specializing in rehabilitation/prosthetics/orthotics shows the greatest variation, with differences of more than $\pm 10\%$ from the national availability found in all geographic regions. The East South Central division has more than double the proportion of specialists in this area than is found in the US.

The West North Central division shows the greatest variability of orthopaedic specialists in all areas, with ten of the 18 focus areas varying by more than $\pm 10\%$ from the national average.

	Percentage Variation ¹ in Orthopaedic Specialty Focus from the National Proportion of Orthopaedic Surgeons by Geographic Division									
	All Respondents (n=13,679)	New England (n=868)	Mid Atlantic (n=1915)	East North Central (n=1955)	West North Central (n=960)	South Atlantic (n=2537)	East South Central (n=753)	West South Central (n=1286)	Mountain (n=1050)	Pacific (n=2303)
Adult hip	39%	-5%	-3%	10%	13%	0%	8%	1%	-10%	-7%
Adult knee	49%	-7%	-4%	6%	8%	0%	7%	6%	-7%	-4%
Adult spine	15%	-1%	5%	-9%	3%	5%	10%	15%	-8%	-8%
Arthroscopy	47%	-6%	-7%	4%	4%	2%	9%	2%	-1%	-4%
Disability/legal orthopaedics	10%	-2%	30%	-33%	-8%	-4%	-9%	-29%	-26%	42%
Foot and ankle	19%	-4%	-9%	5%	16%	1%	27%	5%	-8%	-13%
General orthopaedics	31%	-6%	-3%	2%	-6%	0%	21%	5%	-13%	1%
Hand	22%	-4%	-6%	7%	1%	-2%	16%	-2%	-1%	-1%
Non-surgical office practice	1%	25%	-25%	-38%	63%	13%	0%	-25%	0%	38%
Orthopaedic oncology	2%	33%	-14%	0%	29%	5%	0%	24%	-38%	-10%
Pediatric orthopaedics	11%	-3%	-9%	1%	18%	-1%	10%	7%	-26%	0%
Pediatric spine	5%	-18%	8%	0%	20%	6%	8%	-4%	0%	-14%
Rehabilitation/prosthetics/orthotics	2%	-30%	-26%	-13%	-30%	30%	135%	39%	-48%	-22%
Shoulder and elbow	36%	-9%	-7%	3%	3%	2%	14%	4%	1%	-4%
Sports medicine	41%	-5%	-4%	0%	-2%	4%	0%	2%	3%	-2%
Total joint	30%	-4%	-7%	11%	12%	-3%	10%	4%	-4%	-6%
Trauma	27%	-7%	-6%	6%	11%	-4%	6%	-1%	-30%	-3%
Other focus area	3%	-20%	-10%	-17%	97%	33%	-3%	13%	-43%	3%

¹ Variation calculated by computing the ratio of the proportion of orthopaedic surgeons in each division identifying a specialty focus area to the national proportion, and computing the difference in this proportion from an equal proportion of 100%. A positive variation indicates a higher proportion or potential area of excess of orthopaedic surgeons identifying a specialty focus in a given division than is found in the US as a whole; a negative variation indicates a lower proportion or potential area of need. Variation in need is based on more than a simple national distribution, and includes such factors as the size of population age cohorts, industry and recreational activities that could result in injury, overall density of orthopaedic surgeons and access to large population centers with an abundance of physicians, and other factors.

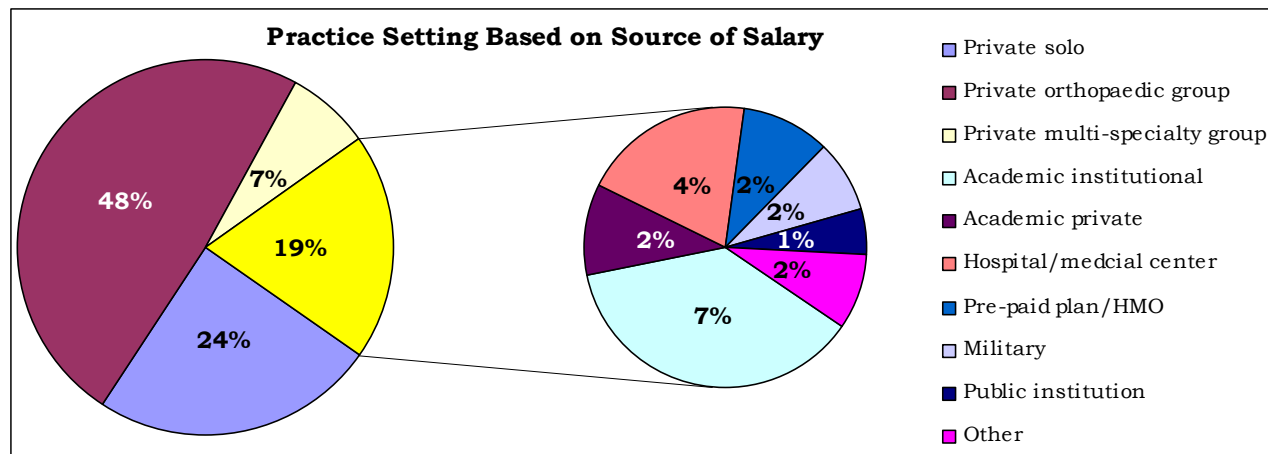
Red indicates a specialty focus area with a variance of $> \pm 10\%$ of the national average level.

Practice Type and Setting

Practice Setting

In recent years, the type of practice setting in which members practice has taken on an increasingly diverse appearance. In the past two census, members were asked to identify their practice setting with respect to their primary income source.

Accounting for 81% of the orthopaedic workforce, private practice continues to dominate the practice setting. Within the private orthopaedic setting, 60% are in orthopaedic group practice, 31% in solo practice, and the remaining 9% are in a multi-specialty practice.



Approximately 9% of the orthopaedic workforce is in an academic practice setting. Within this group, 76% receive their income from the institution, while 24% earn their income. This second group essentially, also is in private practice, but their setting is within an academic institution.

The remaining 10% of orthopaedic surgeons are split between the following types of practice settings:

- Hospital/medical center practice (4%)
- Military practice (2%)
- Pre-paid plan/HMO practice (2%)
- Public institution, non-military (1%)
- Other setting (2%)

Orthopaedic surgeons practicing in an 'other' setting include those doing *Locum tenens* (n=40); however, the majority of respondents in the other category reported they are in a group practice setting, but earn their income independent of the group.

Taken together, about 85% of orthopaedic surgeons earn their income on a private basis. This proportion remains consistent with that of the past decade.

Among the part-time orthopaedic workforce, three out of 4 are working in either private solo practice (41%) or private orthopaedic group practice (33%). A higher

	Full-Time	Part-Time
Private solo	23%	41%
Private orthopaedic group	51%	33%
Private multi-specialty group	8%	5%
Academic institutional	8%	4%
Academic private	2%	1%
Hospital/medical center	4%	4%
Pre-paid plan/HMO	2%	2%
Military	2%	1%
Public institution	1%	3%
Locum Tenans	0%	1%
Other	1%	7%

than expected proportion work as *Locum tenens* or in an Other capacity. Other includes volunteer orthopaedic positions either in the US or internationally.

Trauma Call

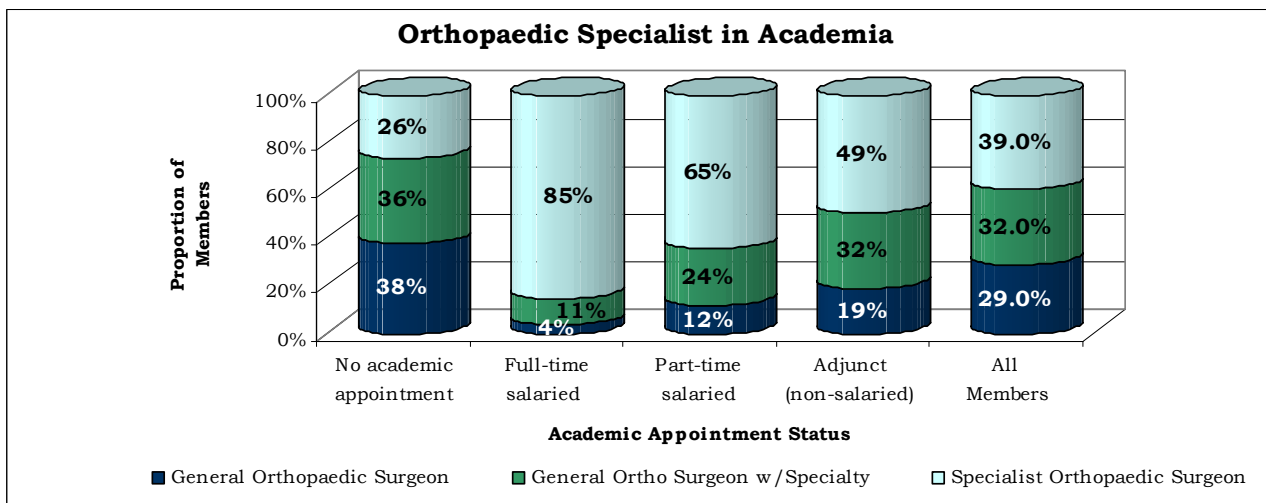
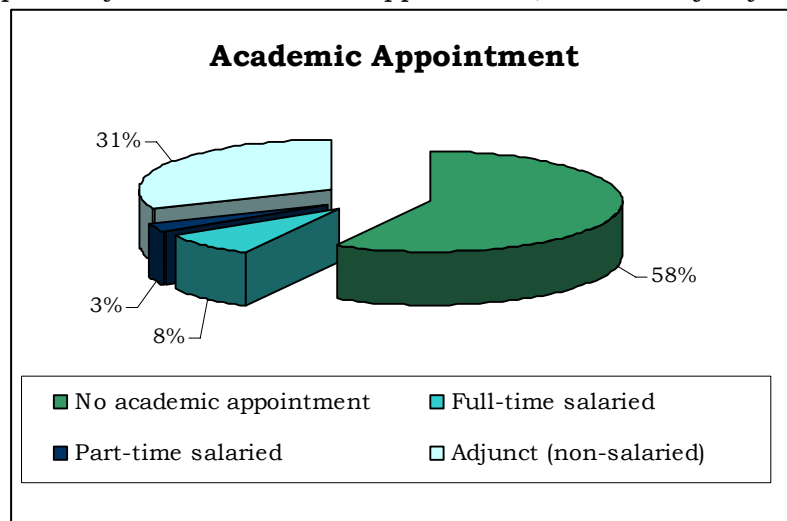
Nearly two out of three orthopaedic surgeons (63%, n=10,436) reported they currently take trauma call associated with an Emergency Department at a hospital in which they have privileges. This question was not asked in 2004; hence, the sample is limited to the 2006 respondents.

Among the surgeons taking trauma call, only 25% reported they receive compensation from the hospital for taking this trauma call.

Academic Appointment

The proportion of orthopaedic surgeons with an academic appointment did not change from the 2004 census. Two in five members report they have an academic appointment, but the majority of these (73%) are non-salaried adjunct positions. Among the salaried academic orthopaedic surgeons, 73% are full-time salaried, constituting 8% of all orthopaedic surgeons.

A strong majority (85%) of full-time salaried academic orthopaedic surgeons are specialists. Even among the adjunct teaching surgeons, one-half are specialists. Only 4% of full-time salaried appointees consider themselves a general orthopaedic surgeon, but this proportion rises to 19% among adjunct faculty. Overall, 58% of orthopaedic specialists, 34% of general orthopaedic surgeons with a specialty, and 22% of general orthopaedic surgeons report an academic appointment at some level.



Fellowships

The proportion of orthopaedic surgeons reporting they have completed a fellowship rose by 2% from the 2004 census to 56%.

Most orthopaedic surgeons (86%) report completing one fellowship. However, 12% reported they have completed two fellowships, while 1% reported completing three. The remaining 1% reported completing more than three fellowships.

It appears some fellowships addressed multiple areas of training, as only 69% of surgeons with a fellowship reported training in only one area. Eighteen percent (18%) reported two training areas, while 7% reported three training areas. The remaining 6% reported four or more training areas.

In all, fellowships in over 11,500 areas of training were identified. Several areas not included in the historic list appeared with enough frequency in the 'other' category to warrant mention in this report. In some instances, respondents may have used different terminology for similar areas of study; however, the additional areas identify very specialized areas of training. Although they account for very small segments of overall fellowship training at this time, the areas of arthroscopy, biomechanics, microsurgery, and rehabilitation may be worth watching.

The leading areas of fellowship study continue to be sports medicine and hand surgery. Adult spine fellowships are once again the third most frequently identified area of training. Fellowships in joint replacement may be included in a number of areas, including total joint, adult knee, adult hip, arthritis, shoulder, hand, and foot and ankle.

Fellowships	Total Number of Mentions	% of Total Mentions	% of Members with a Fellowship	Fellowships	Total Number of Mentions	% of Total Mentions	% of Members with a Fellowship
Sports medicine	2158	18.6%	28.4%	Pediatric spine,	509	4.4%	6.7%
Hand surgery	1521	13.1%	20.0%	Arthritis	323	2.8%	4.3%
Adult spine	1060	9.1%	14.0%	Scoliosis	322	2.8%	4.2%
Total joint	729	6.3%	9.6%	Orthopaedic research	180	1.6%	2.4%
Adult knee	688	5.9%	9.1%	Tumors	175	1.5%	2.3%
Pediatric orthopaedics	672	5.8%	8.8%	General orthopaedics	151	1.3%	2.0%
Adult reconstruction	644	5.6%	8.5%	Other area	121	1.0%	1.6%
Adult hip	579	5.0%	7.6%	Arthroscopy	48	0.4%	0.6%
Trauma & fractures, incl Ilizarov	575	5.0%	7.6%	Biomechanics	22	0.2%	0.3%
Shoulder and elbow	553	4.8%	7.3%	Microsurgery	20	0.2%	0.3%
Foot and ankle	517	4.5%	6.8%	Rehabilitation	19	0.2%	0.3%
				TOTAL N	11,586	11,586	7,596

Respondents reported completing their fellowships from 1947 to 2006, with the number of fellowships completed in each year increasing through 2003. In 2004 and 2005, only 29 and 21 respondents reported completing a fellowship, but this may be an aberration of the respondent sample. During the 1990s and early 2000s, more than 200 orthopaedic surgeons reported completing a fellowship each year.

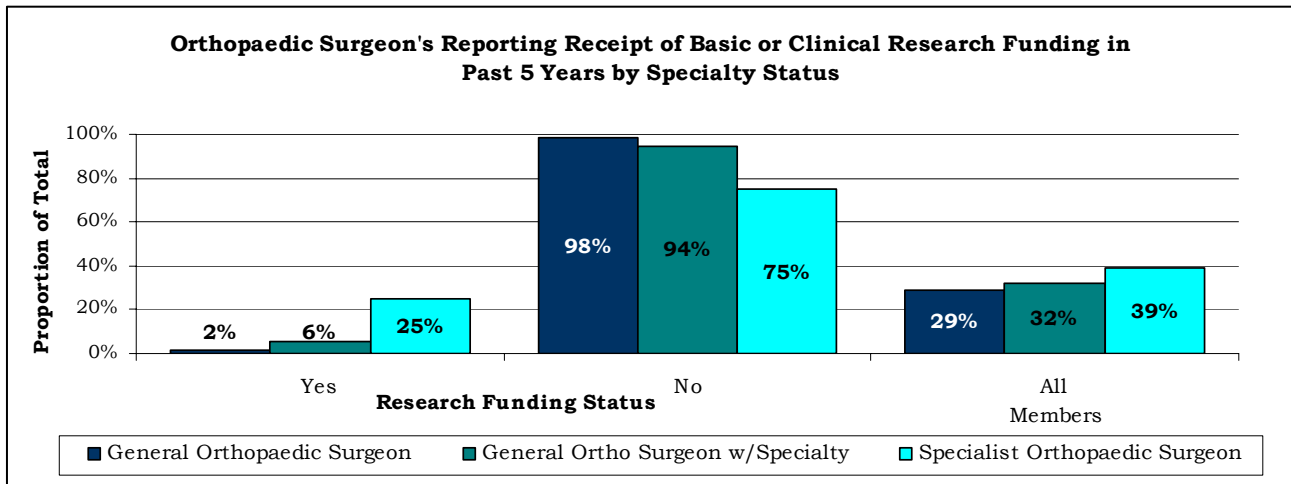
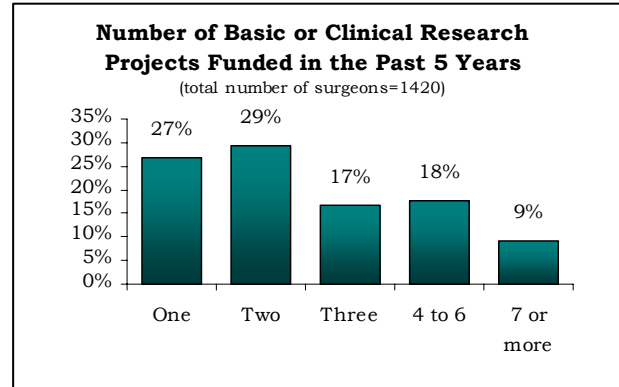
Research Funding

Just over one in ten orthopaedic surgeons, representing 1,594 individuals, reported they have received basic or clinical research funding in the past five years.

The number of research projects funded ranged from one to 70, with 90% receiving funding for six or fewer projects.

Both age and specialty status influences the likelihood of an individual orthopaedic surgeon's receipt of research funding. The median age of funded surgeons is nearly three years younger than the orthopaedic workforce age overall (48.9 years vs. 51.6 years).

Although orthopaedic specialists represent only 39% of the total workforce, they represent 81% of the surgeons reporting receipt of research funding in the past five years. Only 2% of general orthopaedic surgeons and 6% of generalists with a specialty reported research funding, while 25% of specialist did so.



In addition, 83% of orthopaedic surgeons receiving research funding reported they have completed a fellowship, compared to the 56% of orthopaedic surgeons overall completing a fellowship.

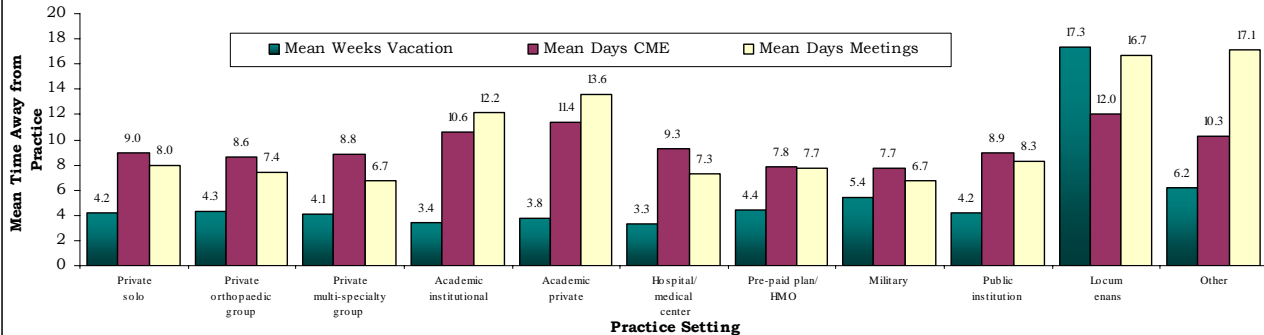
Clinical Practice

Work Schedule—Hours Worked per Week

Full-time orthopaedic surgeons reported working a mean of 61 hours per week, with a range of 40 to 112 hours reported. This is the same mean number of hours reported in 2004. Approximately one-third (30%) reported working 50 hours or less per week, with another one-third working up to 60 hours per week. The remaining one-third reported working more than 60 hours per week.

Although the mean hours worked by all full-time practicing orthopaedic surgeons is more than the standard 40 hour week, surgeons in academic practice continue to report the highest level of

Average Time Away from Practice by Full-Time Practicing Orthopaedic Surgeons (n=12,128)



respectively). The fewest number of days spent in CME were reported by military practice surgeons (7.7); military surgeons and those in a multi-specialty practice setting reported the least number of days spent at professional meetings (6.7).

Orthopaedic specialists report the most time away from practice. Although vacation time is similar to other orthopaedic surgeons, specialists report nearly ten days per year away for CME and an additional ten days for professional meetings.

As orthopaedic surgeons age, the time they spend away from their practice increases. Even among surgeons age 70 and older, time for CME and professional meetings is higher than for younger surgeons.

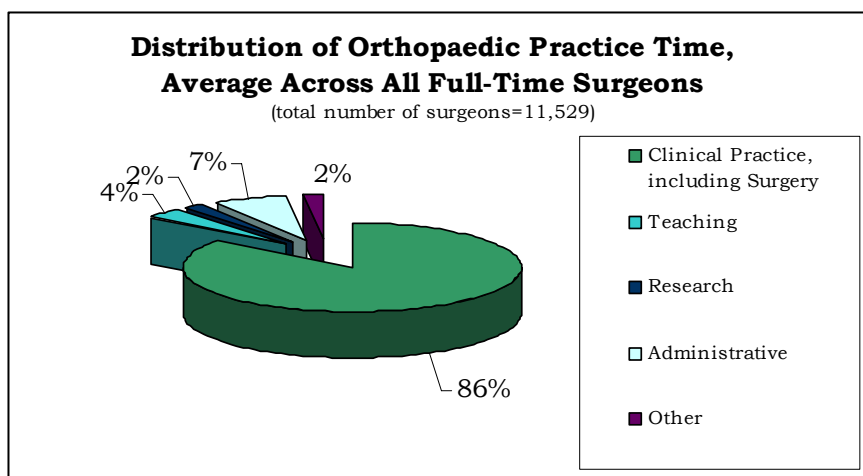
Time Allocation

On average, full-time practicing orthopaedic surgeons spend 86% of their time in clinical practice, which includes office, surgical, and patient rounds time. Approximately one in seven (16%) full-time surgeons report spending 100% of their time in clinical practice.

The remaining time is split between teaching (4%), research (2%), administration (7%) and other related activities (2%).

Part-time orthopaedic surgeons spend slightly less time in clinical practice (75%), and more time in other related activities (15%).

The highest proportion of time spent in teaching is reported by private academic practice surgeons (14%), with institutional academic surgeons reporting only slightly less time (13.6%). Military orthopaedic surgeons report the most time on administrative tasks (19%), while surgeons in an orthopaedic group practice report an average of 5% of their time spent on administration. One in three surgeons (30%) report they spend no time on administrative tasks, with the practice setting distribution of these surgeons similar to the overall workforce.

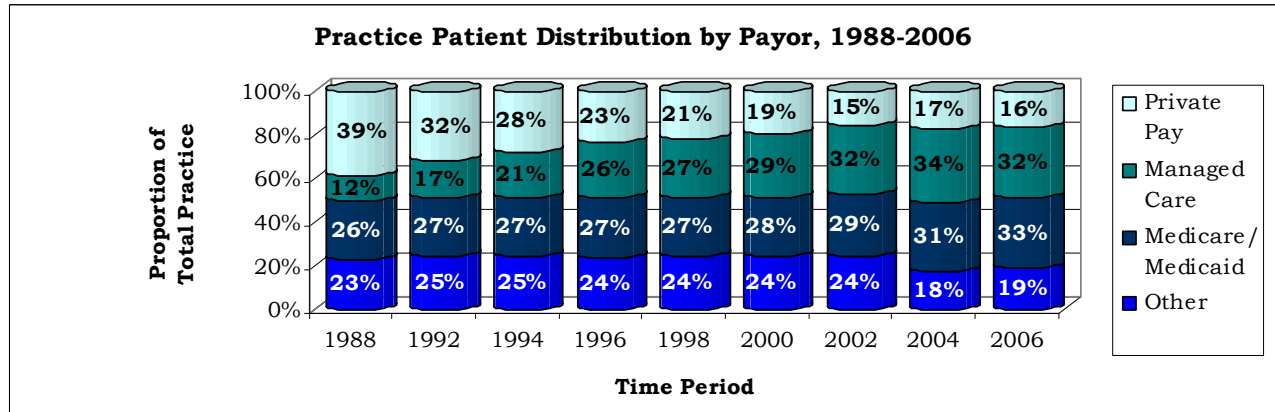


A very small group of 22 orthopaedic surgeons reported they spend more than 50% of their time in research activities. This group represents all practice settings. Although the expected majority comes from an academic setting, 18% are in solo private practice.

Patient Pay Mix

The AAOS Member Census has been tracking the source of payment received by orthopaedic surgeons since 1988. While a significant shift from private pay patients was seen in the first dozen years, since 2000 the distribution between private pay, managed care, government payment, and other sources (workers comp or pro bono work) has not changed.

In 2006, orthopaedic surgeons reported 19% of their patient payment came from private sources, including private insurance and self-pay. The 33% of patient payment reported from managed care was split between HMOs (8.5%) and PPOs (24.2%). Government patient payments are primarily Medicare patients (24.8%), with only 7.1% coming from Medicaid. Worker's compensation patient payments accounted for nearly 12% of total orthopaedic surgeon payment, while 4% of their service time was considered pro bono.



Pro bono orthopaedic services are more likely to be provided by surgeons between the ages of 40 and 49 than by doctors in other age groups; however, surgeons in all age groups provide pro bono services.

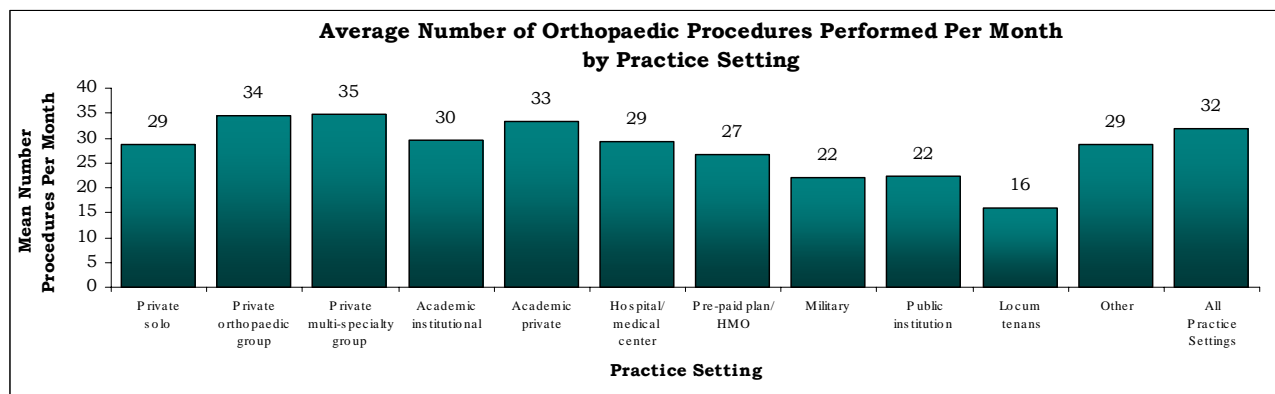
Procedures Performed

In 2004, for the first time, the AAOS member census asked surgeons about the number of surgical procedures they perform in a typical month. In the 2006 data collection, the mean number of orthopaedic procedures performed in a typical month reported by 84% of the responding members is 32, with a median number between 29 and 30 procedures. The range of procedures performed was one to 100 (total number capped for data cleaning purposes).

Full-time practicing surgeons report performing an average of 33 procedures per month; part-time practicing surgeons report an average of 19.

By practice setting, surgeons in private group or academic practice report the highest average number of procedures performed per month.

General orthopaedic surgeons report an average of 28 procedures performed per month; specialists report performing 33.



As orthopaedic surgeons age, they report performing fewer surgical procedures; however, even surgeons age 70 and over report performing an average of 19 procedures per month. The highest average number of procedures performed monthly (35) is by orthopaedic surgeons in the 40 to 49 age bracket.

Respondents also were asked about the number of procedures performed for a select group of frequently performed procedures. Because only 12 common procedures were included in the listing, we recognized that some specialists would not be likely to perform any of the listed procedures. The intent of the item is to gain a sense of the number of procedures as a comparison to and supplement for the data found in national health care databases. At some future time, this information may provide the basis for establishing projections of future need.

Both inpatient and outpatient settings were listed. Some respondents separated their responses into the two settings, while others included all their procedures in only one setting. For that reason, the number of total procedures analyzed is the sum of the two columns. Using respondents who identified both inpatient and outpatient procedures, a proportion of the number of procedures typically performed in the outpatient setting is estimated.

Number of Common Orthopaedic Procedures Performed Per Month									
Procedure	ICD-9-CM Code	Minimum	Maximum	Mean Procedures (n=11,246)	St. Dev.	Reporting Procedure		Reporting Outpatient	
						Mean Performed	N Reporting	% Outpatient	N Reporting
Release of Carpal Tunnel	04.43	0	83	2.96	4.73	4.58	7268	99%	3257
Arthroscopy of knee	80.26	0	70	7.32	7.33	9.53	8636	98%	4142
Spinal fusion or re-fusion	81.0x or .3x	0	80	1.08	3.72	7.79	1562	8%	495
Repair of cruciate ligament (ACL), including reconstruction	81.45	0	31	1.35	2.21	2.75	5527	86%	2653
Total hip replacement	81.51	0	50	2.12	3.52	3.89	6125	2%	3227
Partial hip replacement	81.52	0	62	1.29	2.05	2.71	5351	3%	2873
Revision of hip replacement	81.53	0	51	0.33	1.09	1.80	2030	2%	1055
Partial knee replacement (unicompartmental)	81.54	0	60	0.44	1.62	2.45	2029	6%	1086
Total knee replacement (bi- or tri-compartmental)	81.54	0	80	3.58	5.18	5.88	6853	2%	3692
Revision of knee replacement	81.55	0	60	0.35	1.22	1.74	2234	4%	1170
Rotator cuff repair	83.63	0	60	3.55	4.48	5.12	7806	69%	3669
Replacement of spinal disc or revision of disc	84.6x	0	60	0.09	1.16	4.20	245	32%	75

Using the total respondents providing estimates of procedures performed, the most commonly performed procedures are arthroscopy of the knee (7.3 per month), total knee replacement (3.6), rotator cuff repair (3.6), and release of carpal tunnel (3.0). When looking only at those surgeons who reported a specific procedure, the impact of the number of surgeons performing that procedure is evident. For example, the number of orthopaedic surgeons reporting performance of spinal procedures is much lower than for other procedures listed, but their average number performed monthly is comparable to the more widely performed procedures such as release of carpal tunnel, rotator cuff repair, and hip and knee replacements.

A number of the procedures are performed almost exclusively in outpatient settings, but even the more complex procedures appear to be moving to outpatient settings. This was also evident in the 2004 census when respondents hand entered outpatient procedures for joint replacements.

Retired and Retiring Orthopaedic Surgeons

One in ten (10%, n=1614) certified orthopaedic surgeons responding to the 2006 member census reported they are currently retired. The majority of the retired members (85%) are from the Emeritus membership group, but 9% are currently Fellows, with another 6% from non-members.

Respondents indicated whether they had retired within the past two years or more than two years ago. As expected, the majority (75%) reported retirement more than two years ago. However, among the retired Fellow members, 62% retired within the past two years.

The mean age at which Fellows and non-members reported they fully retired from orthopaedic practice was 59 years. The mean retirement age for Emeritus members reported was 67 years. Overall, 12% reported full retirement before the typical retirement age of 65, while 46% reported they did not retire until in their 70s.

These statistics indicate two key aspects of the orthopaedic workforce.

- 1 There is a small, but significant, group of orthopaedic surgeons retiring from active practice earlier than the expected retirement age of 65 in the US. The reasons for this retirement are unknown without further study.
- 2 There is a sizable contingent of orthopaedic surgeons who are continuing to actively practice in orthopaedic surgery well beyond the expected retirement age of 65. Based on other information provided in the census, the majority of the late retirees likely gave up surgical practice at a younger age, but continued to provide office orthopaedic services and disability reviews for a number of years. The 2006 census did not address the reasons why they choose to continue their practice.

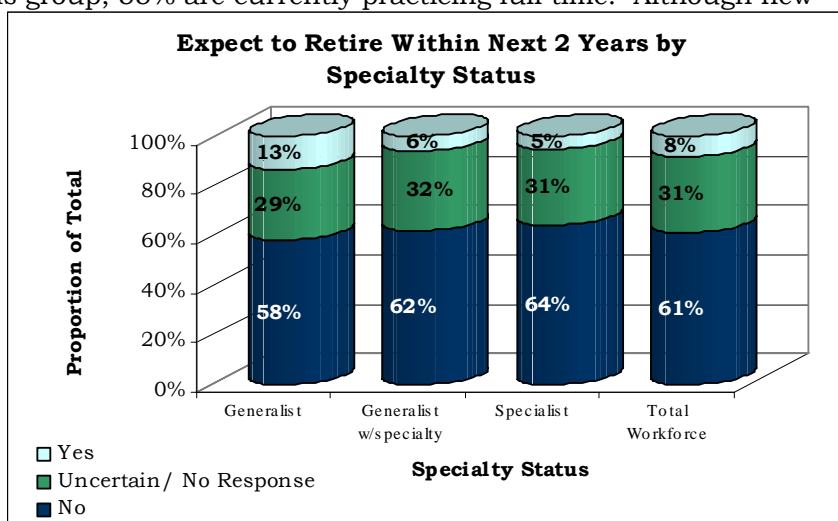
Additional study of the retired segment of the membership would assist in the identification of trends or reasons for early retirement or for extending work life beyond the typical retirement age.

Anticipated Retirement

Nearly 8% of the respondents reported they expect to fully retire from the practice of medicine within the next two years. Of this group, 55% are currently practicing full time. Although new retirees will come from all practice settings, a higher than expected proportion are currently in solo private practice, while a lower than expected proportion are in group orthopaedic practice.

Likewise, a higher than expected proportion of new retirees will come from the ranks of orthopaedic generalists, with 13% of this workforce segment expecting to retire within the next two years.

New retirees will primarily come from practicing orthopaedic surgeons who are currently age 60 or over. One in four (24%) of current practicing orthopaedic surgeons in the age group 60 to 69 report they expect to retire within the next two years, while one in three (33%) of those age 70 or over expect to retire. However, 4% of practicing surgeons age 40 to 49 years, and 1% of those younger than 40, indicated they also expect to retire from active orthopaedic surgery practice in the next two years.



Appendix A. 2006 Member Census Questionnaire

AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS 2006 ORTHOPAEDIC PHYSICIAN CENSUS

VERIFICATION OF CONTACT INFORMATION

If the contact information in your cover letter is incorrect (eg, address, phone, fax, email), please go [ONLINE to www.aaos.org/myprofile](http://www.aaos.org/myprofile) to correct it, or fax updated contact information to Member Services at (847) 823-8024.

You may FAX your completed census to (847) 574-7550,
or mail it to AAOS Research-Census, 6300 N River Road, Rosemont, IL 60018-4262. Thank you.

Demographic Information

Ethnicity (Please choose one)

- Caucasian
- African American
- Hispanic/Latino
- Asian American
- Native American
- Multi Racial
- Other

In addition to English, are you fluent (speak, read and write well) in other languages?

- No
- Yes - Specify language(s)
 - Spanish
 - French
 - German
 - Italian
 - Other (Specify)
- Arabic
- Japanese
- Chinese
- Portuguese

Section A - Professional Information

1. Please indicate membership in the following organizations by checking the appropriate box(es).

- American College of Surgeons
- American Medical Association
- State Medical Society
- State Orthopaedic Society

2. What is your current professional work status? (SELECT ONLY ONE)

- Full time
- Part time
- Fully retired in the past 2 years
- Fully retired more than 2 years ago



Do you plan to retire within the next 2 years?

- No
- Yes

If fully retired, at what age did you retire?

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IF FULLY RETIRED, PLEASE STOP HERE!
RETURN ALL PAGES OF THE CENSUS TO THE AAOS.

3. Which of the following most closely describes your practice? (SELECT ONE)

- General orthopaedic surgeon
- General orthopaedic surgeon with an area of specialty interest (at least 25% but less than 75% of practice committed to an area of specialty interest)
- Specialist within orthopaedic surgery (75% or more of practice committed to an area of specialty interest)

4. Have you been ABOS re-certified?

- No
- Yes

[MOST RECENT YEAR]

--	--	--	--

(yyyy)

5. Do you have a subspecialty certificate in hand surgery (formerly CAQ)?

- No
- Yes

[INDICATE YEAR]

--	--	--	--

(yyyy)



6. Please indicate the areas of orthopaedics you consider to be your primary or specialty areas (SELECT ALL THAT APPLY)

- | | |
|---|---|
| <input type="checkbox"/> Adult hip | <input type="checkbox"/> Pediatric orthopaedic |
| <input type="checkbox"/> Adult knee | <input type="checkbox"/> Pediatric spine |
| <input type="checkbox"/> Adult spine | <input type="checkbox"/> Rehabilitation/prosthetics/orthotics |
| <input type="checkbox"/> Arthroscopy | <input type="checkbox"/> Shoulder and elbow |
| <input type="checkbox"/> Disability/legal orthopaedic | <input type="checkbox"/> Sports medicine |
| <input type="checkbox"/> Foot and ankle | <input type="checkbox"/> Total joint |
| <input type="checkbox"/> Hand | <input type="checkbox"/> Trauma |
| <input type="checkbox"/> Orthopaedic oncology | <input type="checkbox"/> Other <input type="text"/> |

7. Which of the following services do you provide within your office? (SELECT ALL THAT APPLY)

- Ambulatory surgery
 CT
 EMG
 MRI
 Pain Management
 Phys. or Occup. Therapy
 X-ray

Section B - PRACTICE TYPE AND SETTING

8. Which ONE setting listed below best describes your practice?

- Private Practice - Solo (income self-earned)
- Private Practice - Orthopaedic Group (income from group) } # of Orthopaedic Surgeons in group
- Private Practice - Multi-spec. group (income from group) }
- Academic Practice (salary from academic institution)
- Academic Practice (salary from private practice)
- Military Practice (salary from military)
- Public Institution (salary from non-military govt. entity)
- Pre-paid Plan/HMO (salary from HMO)
- Hospital/Medical Center (salary from hospital/med. center)
- Locum Tenens
- Other

9. Do you currently have an appointment with a medical school or teaching hospital?

- No
 Yes - Full time salaried
 Yes -Part time salaried
 Yes -Adjunct (non-salaried)

10. Do you take trauma call associated with an Emergency Department at a hospital in which you have privileges?

- No
 Yes

10A. If yes, are you compensated from the hospital for taking this trauma call?

- No
 Yes

11. Have you received basic or clinical research funding in the past 5 years?

- No
 Yes If yes, how many projects were funded?

12. Do you currently have, or have you ever completed, a fellowship? No (skip to q15) Yes Number of fellowships:

13. What year did you complete your last fellowship? (yyyy)

14. Fellowship Specialty Area(s) Completed (SELECT ALL THAT APPLY)

- | | | |
|---|---|---|
| <input type="checkbox"/> Arthritis | <input type="checkbox"/> General orthopaedics | <input type="checkbox"/> Shoulder and elbow |
| <input type="checkbox"/> Adult hip | <input type="checkbox"/> Hand surgery | <input type="checkbox"/> Sports medicine |
| <input type="checkbox"/> Adult knee | <input type="checkbox"/> Orthopaedic research | <input type="checkbox"/> Total joint |
| <input type="checkbox"/> Adult reconstruction | <input type="checkbox"/> Pediatric orthopaedics | <input type="checkbox"/> Trauma and fractures |
| <input type="checkbox"/> Adult spine | <input type="checkbox"/> Pediatric spine | <input type="checkbox"/> Tumors |
| <input type="checkbox"/> Foot and ankle | <input type="checkbox"/> Scoliosis | <input type="checkbox"/> Other <input type="text"/> |

15. Average hours worked per week on all activities (exclude on-call time) hrs/wk
(note: 7days@16hrs/day = 112 hrs/wk)

16. In 2005, how many total WEEKS (cumulative rounded to nearest full week) did you spend away from orthopaedic practice for vacation? weeks

17. In 2005, how many total DAYS did you spend away from orthopaedic practice for:

Orthopaedic business-related meetings, activities, and volunteer work days

Orthopaedic education/training (CME) (include CMEs taken at Annual Meeting) days



Appendix B. US Census Divisions

New England

- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont

Mid-Atlantic

- New Jersey
- New York
- Pennsylvania

East North Central

- Illinois
- Indiana
- Michigan
- Ohio
- Wisconsin

West North Central

- Iowa
- Kansas
- Minnesota
- Missouri,
- Nebraska
- North Dakota
- South Dakota

South Atlantic

- Delaware
- District of Columbia
- Florida
- Georgia
- Maryland
- North Carolina
- South Carolina
- Virginia
- West Virginia

East South Central

- Alabama
- Kentucky
- Mississippi
- Tennessee

West South Central

- Arkansas
- Louisiana
- Oklahoma
- Texas

Mountain

- Arizona
- Colorado
- Idaho
- Montana
- Nevada
- New Mexico
- Utah
- Wyoming

Pacific

- Alaska
- California
- Hawaii
- Oregon
- Washington

Appendix C. Orthopaedic Surgeon Density

Orthopaedic surgeon density is calculated from AAOS membership by state using the most recent population estimates from the US Department of Census.

2006 Orthopaedic Surgeon Density by State per 100,000 Population

State Abbrev	State	Number of Orthopaedic Surgeons ¹	Population ²	Density ³	Population per Surgeon
AL	Alabama	290	4,557,808	6.36	15,717
AK	Alaska	64	663,661	9.64	10,370
AZ	Arizona	301	5,939,292	5.07	19,732
AR	Arkansas	145	2,779,154	5.22	19,167
CA	California	2180	36,132,147	6.03	16,574
CO	Colorado	369	4,665,177	7.91	12,643
CT	Connecticut	284	3,510,297	8.09	12,360
DE	Delaware	65	843,524	7.71	12,977
DC	District of Columbia	54	550,521	9.81	10,195
FL	Florida	1035	17,789,864	5.82	17,188
GA	Georgia	485	9,072,576	5.35	18,706
HI	Hawaii	84	1,275,194	6.59	15,181
ID	Idaho	115	1,429,096	8.05	12,427
IL	Illinois	689	12,763,371	5.40	18,524
IN	Indiana	354	6,271,973	5.64	17,717
IA	Iowa	168	2,966,334	5.66	17,657
KS	Kansas	154	2,744,687	5.61	17,823
KY	Kentucky	216	4,173,405	5.18	19,321
LA	Louisiana	261	4,523,628	5.77	17,332
ME	Maine	102	1,321,505	7.72	12,956
MD	Maryland	438	5,600,388	7.82	12,786
MA	Massachusetts	495	6,398,743	7.74	12,927
MI	Michigan	444	10,120,860	4.39	22,795
MN	Minnesota	354	5,132,799	6.90	14,499
MS	Mississippi	128	2,921,088	4.38	22,821
MO	Missouri	337	5,800,310	5.81	17,212
MT	Montana	100	935,670	10.69	9,357
NE	Nebraska	127	1,758,787	7.22	13,849
NV	Nevada	126	2,414,807	5.22	19,165
NH	New Hampshire	110	1,309,940	8.40	11,909
NJ	New Jersey	558	8,717,925	6.40	15,624
NM	New Mexico	98	1,928,384	5.08	19,677
NY	New York	1183	19,254,630	6.14	16,276
NC	North Carolina	545	8,683,242	6.28	15,933
ND	North Dakota	42	636,677	6.60	15,159

State Abbrev	State	Number of Orthopaedic Surgeons ¹	Population ²	Density ³	Population per Surgeon
OH	Ohio	629	11,464,042	5.49	18,226
OK	Oklahoma	176	3,547,884	4.96	20,158
OR	Oregon	268	3,641,056	7.36	13,586
PA	Pennsylvania	764	12,429,616	6.15	16,269
RI	Rhode Island	87	1,076,189	8.08	12,370
SC	South Carolina	270	4,255,083	6.35	15,760
SD	South Dakota	58	775,933	7.47	13,378
TN	Tennessee	406	5,962,959	6.81	14,687
TX	Texas	1141	22,859,968	4.99	20,035
UT	Utah	149	2,469,585	6.03	16,574
VT	Vermont	54	623,050	8.67	11,538
VA	Virginia	485	7,567,465	6.41	15,603
WA	Washington	453	6,287,759	7.20	13,880
WV	West Virginia	76	1,816,856	4.18	23,906
WI	Wisconsin	397	5,536,201	7.17	13,945
WY	Wyoming	62	509,294	12.17	8,214
	Total USA	17,975	296,410,404	6.06	16,490

¹ Board certified Fellows and Candidate Member, Candidate Member Practitioner Applied for Fellowship, and Applicant for Fellowship, Nonmember Practitioner from membership records, 6-07-06; known active Emeritus and Non-Member Orthopaedic Surgeons from 2006 Member Census.

² US Census of Population and Housing state population estimates for July 1, 2005

³ Density is the number of Orthopaedic Surgeons per 100,000 populations.

2006 Orthopaedic Surgeon Density by Census Division per 100,000 Population*

Division	Number of Orthopaedic Surgeons ¹	Population ²	Density ³	Population per Surgeon
New England	1,132	14,239,724	7.9	12,579
Mid Atlantic	2,505	40,402,171	6.2	16,129
East North Central	2,513	46,156,447	5.4	18,367
West North Central	1,240	19,815,527	6.3	15,980
South Atlantic	3,453	56,179,519	6.1	16,270
East South Central	1,040	17,615,260	5.9	16,938
West South Central	1,723	33,710,634	5.1	19,565
Mountain	1,320	20,291,305	6.5	15,372
Pacific	3,049	47,999,817	6.4	15,743
Total USA	17,975	296,410,404	6.1	16,490

¹ Board certified Fellows and Candidate Member, Candidate Member Practitioner Applied for Fellowship, and Applicant for Fellowship, Nonmember Practitioner from membership records, 6-07-06; known active Emeritus and Non-Member Orthopaedic Surgeons from 2006 Member Census.

² US Census of Population and Housing state population estimates for July 1, 2005

³ Density is the number of Orthopaedic Surgeons per 100,000 populations.

Change in Orthopaedic Workforce Density in 2006 from 2004

State Abbrev	State	Change in Number of Orthopaedic Surgeons¹	US Population Change²	Change in Density³
AK	Alaska	0	36,729	-0.6
AL	Alabama	8	110,708	0.0
AR	Arkansas	-1	105,754	-0.2
AZ	Arizona	14	808,660	-0.5
CA	California	113	2,260,499	-0.1
CO	Colorado	23	363,916	-0.1
CT	Connecticut	4	104,732	-0.1
DC	District of Columbia	-3	(21,538)	-0.2
DE	Delaware	1	59,924	-0.5
FL	Florida	33	1,807,486	-0.5
GA	Georgia	-5	886,123	-0.6
HI	Hawaii	12	63,657	0.6
IA	Iowa	5	40,010	0.1
ID	Idaho	6	135,143	-0.4
IL	Illinois	-8	344,078	-0.2
IN	Indiana	7	191,488	-0.1
KS	Kansas	0	56,269	-0.1
KY	Kentucky	-4	131,636	-0.3
LA	Louisiana	-5	54,652	-0.2
MA	Massachusetts	24	49,646	0.3
MD	Maryland	10	303,902	-0.3
ME	Maine	7	6,582	0.3
MI	Michigan	29	82,416	0.2
MN	Minnesota	15	213,320	0.0
MO	Missouri	14	205,099	0.0
MS	Mississippi	1	76,430	-0.1
MT	Montana	2	33,475	-0.2
NC	North Carolina	-6	633,929	-0.6
ND	North Dakota	4	(5,523)	0.7
NE	Nebraska	1	47,524	-0.1
NH	New Hampshire	2	74,154	-0.3
NJ	New Jersey	16	303,575	0.0
NM	New Mexico	0	109,338	-0.3
NV	Nevada	4	416,550	-0.9
NY	New York	44	78,173	0.1
OH	Ohio	13	110,902	0.1
OK	Oklahoma	-2	97,230	-0.2
OR	Oregon	9	219,657	-0.2

PA	Pennsylvania	21	148,562	0.1
RI	Rhode Island	3	27,870	0.1
SC	South Carolina	5	243,071	-0.3
SD	South Dakota	-1	21,089	-0.3
TN	Tennessee	6	273,676	-0.2
TX	Texas	52	2,008,148	-0.2
UT	Utah	0	236,416	-0.6
VA	Virginia	-17	488,950	-0.7
VT	Vermont	2	14,223	0.1
WA	Washington	24	393,638	-0.1
WI	Wisconsin	4	172,526	-0.2
WV	West Virginia	-5	8,512	-0.3
WY	Wyoming	8	15,512	1.2
	Total USA	489	14,988,498	-0.1

1 Change in number of orthopaedic surgeons is calculated by subtracting 2004 member numbers from 2006 member numbers. Membership counts included board certified Fellows and Candidate Member, Candidate Member Practitioner Applied for Fellowship, and Applicant for Fellowship, Nonmember Practitioner from membership records, 6-07-06; known active Emeritus and Non-Member Orthopaedic Surgeons from 2006 Member Census. A negative number indicates a loss of orthopaedic surgeons; a positive number a gain.

2 Change in population calculated by subtracting US Census of Population and Housing state population for 2000 in 2004 from state estimates for July 1, 2005, in 2006.

3 Change in density is the difference in the number of Orthopaedic Surgeons per 100,000 populations. A negative number indicates a decline in density (fewer ortho surgeons per 100,000); a positive number indicates an increase in density (more ortho surgeons per 100,000).

Appendix C. Open-Ended Responses

Languages Spoken

Language	# of Members Speaking	Language	# of Members Speaking
Indian dialects	172	Turkish	11
Hebrew/Yiddish	101	Norwegian	10
Greek	84	Latvian	9
Farsi	63	Dutch	8
Korean	61	Spanish dialects (mid/central America)	8
Russian	30	African dialects	7
Persian	27	Bengali	6
Armenian	25	Lithuanian	6
Hungarian	25	Danish	5
Filipino/Tagalog	22	Sign language	5
Polish	22	Finnish	4
Swedish	17	Romanian	4
Czeck/Slovian	16	Taiwanese	4
Ukrainian	14	Estonian	3
Africans	13	Vietnamese	3
Croatian/Serbian	13	Irish	2
Thai	13	Other	21

Other Practice Setting

2 DAYS PER WEEK IN PRIVATE PRACTICE; 3 DAYS PER WE
20% PRIVATE GEN ORTHO GROUP AND 80% HOSPITAL ADMIN
5 MAN GROUP WE SHARE OVERHEAD BUT NOT INCOME
50% PRIVATE PRACTICE - SOLO (INCOME SELF-EARNED);
80 % multispecialty group as employee; 20 % Orthop
ACADEMIC & INCENTIVE DOLLARS COLLECTED
ACADEMIC (PRIVATE AND SALARY)
ACADEMIC INSTITUTION AND HOSP/MED CENTER
ACADEMIC MULTI SPECIALTY GROUP
ACADEMIC PRACTICE (SALARY FROM ACADEMIC INSTITUTIO
ACADEMIC PRACTICE (SALARY FROM ACADEMIC INSTITUTIO
ACADEMIC PRACTICE (SALARY FROM ACADEMIC INSTITUTIO
ACADEMIC PRACTICE (SALARY FROM PRIVATE AND ACADEMI
ACADEMIC PRACTICE (SALARY FROM PRIVATE PRACTICE)
ACADEMIC PRACTICE (SALARY FROM PRIVATE PRACTICE)
ACADEMIC PRACTICE- SALARY FROM ACADEMIC INSTITUTIO
ACADEMIC PRACTICE SALARY FROM ACADEMIC INSTITUTION
ACADEMIC PRACTICE, PAID BY QUEBEC GOVERNMENT
academic salary plus private practice income
Administration / Accreditation
administrative/hospital employed
ADMISSION COMPANY AT UICOU
ALL SELF-EARNED INCOME BY IN GROUP
ASSIST IN OR TEACH MED. SCHOOL AND ACADEMIC PRACTI
ASSIST IN SURGERY ONLY
ASSIST WITH SURGERY AND 1.5 DAYS OFFICE/WEEK
assisting at surgery
Bioethics/Volunteer/Disaster "Good Samaritan" Rep
CDNSULTATIONS (NONSURGICAL)
CHIEF ORTHOPEDIC SURGERY VA MEDICAL CENTER
CHIEF SURGEON EMERITAN SHINOR HOSPITAL
COMBINATION OF ACAD/SAL FROM PRIVATE PRACTICE, 2)
COMBO 1) SOLO (40%) 2) HOSP (40%) 3) PUB
COMMUNITY CLINIC OF 42,000 PATIENTS
COMPENSATION VAND PENSION EXAMS FOR VA IN PUGET SO
CONSULTANT FOR REHAB CENTER
consultant large insurance co
CONSULTANT ONLY
CONSULTANT TO DEPUY SPINE
consulting practice only as employee of ortho group
CONSULTING, IMES, ETC.
CONTRACT PHYS USCG
CURRENTLY ON SABBATICAL FROM GROUP (2006)
CURRENTLY UNEMPLOYED
DEAN
DISABILITY & ADMINISTRATIVE MEDICINE
DISABILITY EVALUATION
DISABILITY EVALUATIONS ONLY
DO NOT TREAT PTS. LAST 5 YRS
EMPLOYED BY GROUP (ORTHOAEDIC)
EMPLOYED BY HEALTH ORGANIZATION
EMPLOYEE PROVIDING FIRST SURGICAL ASSISTS
ER CALL SHOULD BE CORPORATED
EX DIRECTOR OF SOS
EXPENSE SHARING
Expert Witness for Social Security, Office of Hear
FED GOV VA
Fellow-Academic
FEW IMES
FULL TIME EMPLOYMENT WITH DEVICE COMPANY
GENERAL MEDICINE PRACTICE AT UNIVERSITY HEALTH CEN
GOVT/SSI CONSULTANT
GROUP PRACTICE
GROUP PRACTICE-INCOME SELF EARNED
GROUP PRACTICE-INCOME SELF EARNED
HAND FELLOW (GRADUATE 2006)
HAND SPECIALTY GROUP
HAND SURGERY GROUP-5 PHYSICIANS

HAVE DISCONTINUED DOING SURGERY
HOME MISSION WITH NONPROFIT
Hospital Clinic
HOSPITAL GUARANTEE/RELOCATION
HOSPITAL/MEDICAL CENTER (3 MONS) AND LOCUM TENENS
HOSPITAL/MEDICAL CENTER (SALARY FROM HOSPITAL/MED
HOSPITAL/MEDICAL CENTER (SALARY FROM HOSPITAL/MED
HOSPITAL/MEDICAL CENTER AND LOCUM TENENS
I do not see patients and receive no income.
I ENENS
I PERFORM IME'S ONLY AND PLAN TO STOP SOMETIME IN
I WORK ON A VOLUNTARY BASIS; ACADEMIC PRACTICE (SA
IME (8 respondents)
IME & Medocolegal
IME ORTHOPEDIC
IME, QME, AME AND PRIVATE PRACTICE - SOLO(INCOME S
IME/HOSPITAL BASED
IME'S ARBITER, LOCUM TENENS
IME'S WITH 5 COMPANIES
IMES, consultant
IMES/LEGAL ORTHOPAEDICS
in Fellowship
IN MULTI-SPECIALTY GROUP; ALL INCOME SELF-EARNED
IN OR SURGICAL ASSIST ONLY
INACTIVE DUE TO DISABILITY
INDEPENDENT CONTRACT
INDEPENDENT CONTRACTOR
independent contractor
INDEPENDENT CONTRACTOR
INDEPENDENT CONTRACTOR FOR IME'S
INDEPENDENT CONTRACTOR-DISABILITY EVAL
INDEPENDENT EVALUATIONS ONLY
INDEPENDENT MEDICAL EVALUATIONS
independent medical examiner
Independent medical exams
INDEPENDENT MEDICAL EXAMS
INS. MED. REVIEW
INSURANCE CONSULTS
MAINLY DO IMES
MARKED ACADEMIC INSTIT AND LOCUM TENENS, WROTE IT
MARKED BOTH ACADEMIC CHOICES
MARKED BOTH ACADEMIC PRACTICE TYPES
MARKED BOTH ACADEMIC PRACTICES, AND HOSPITAL/MEDIC
MARKED PRIVATE GROUP AND ACADEMIC PRACTICE
MARKED PRIVATE PRACTICE AND HOSPITAL MED CENTER
MD/MONITER IN CARDIAC REHAB
MEDICAID CLINIC
Medicaid director in HMO
Medical Director in Workers' Compensation Insurance
MEDICAL DIRECTOR INS CO/MEDICINE MANAGEMENT
MEDICAL LEGAL EXAMS
MEDICAL LEGAL, W. COMPENSATION
MEDICAL MANAGEMENT
MEDICAL REVIEW WORK & IME'S, PRIVATE PRACTICE - SO
MEDICOLEGAL EVALUATION ONLY AND PRIVATE PRACTICE -
Missionary, teaching residents
MLMIC CONSULTANT
multi specialty group, no shared income
Multispecialty group (not HMO)
NATIONAL CHARITY ORGANIZATION AND HOSPITAL/MEDICAL
NGO WORK OVERSEAS
NON-SURGICAL
NOT IN PRACTICENOW
OCC MED
Occasional utilization reviews
OCCUPATIONAL MEDICINE
ON SABBATICAL/WRITING
ORTHO GROUP PRACTICE-INCOME SELF GENERATED

ortho group with academic affiliation income self
 ORTHO GRROUP-INCOMEM SELF EARNED
 ORTHO SURGEON FOR INS. COMPANY
 Orthopaedic consultant for VA outpatient Clinic
 ORTHOPAEDIC GROUP-INCOME SELF EARNED
 OTHER - VA
 OUTPATIENT COUNTY FACILITY
 part academic part ortho group
 PART TIME-GENERAL
 PAST HOSPITAL SALARY/PART PRIVATE PRACTICE
 PP Group income self earned
 PRIVATE BUT ACADEMIC
 PRIVATE GROUP (SOLO MULTI-SPEC. GROUP) AND PRIVATE
 PRIVATE GRP/SINGLE SIZE-INCOME SELF-EARNED
 PRIVATE NONGROUP BUT HOSP BASED-ASSIST AT SURGERY
 PRIVATE PRAC/GROUP INCOME SELF-EARNED
 PRIVATE PRACTIC ORTHOPEDIC GROUP-INCOME SELF-EARNE
 Private Practice - Group (income self earned)
 PRIVATE PRACTICE - HAND SURGERY GROUP
 Private Practice - Hand Surgery Group
 PRIVATE PRACTICE - MULTI-SPEC GROUP AND ACADEMIC P
 PRIVATE PRACTICE - ORTHOPAEDIC GROUP AND PUBLIC IN
 PRIVATE PRACTICE - ORTHOPAEDIC GROUP WITH 23 SURGE
 PRIVATE PRACTICE - SOLO (INCOME SELF-EARNED)
 PRIVATE PRACTICE - SOLO (INCOME SELF-EARNED)
 PRIVATE PRACTICE - SOLO AND OFFICE PRACTICE
 PRIVATE PRACTICE - SOLO INCOME SELF-EARNED AND PRI
 PRIVATE PRACTICE (SELF EARNED) - SHARE OVERHEAD WI
 Private practice and hospital-based practice
 PRIVATE PRACTICE AND PUBLIC INSTITUTION
 private practice group-self earned income
 PRIVATE PRACTICE HAND GROUP- KEEP INCOME INDIVIDUA
 PRIVATE PRACTICE HAND SURGERY GROUP 5 SURGEONS
 PRIVATE PRACTICE IN ORTHO GROUP
 PRIVATE PRACTICE- MULTI-SPEC GROUP, AND ACADEMIC P
 PRIVATE PRACTICE- PLASTICS GROUP
 PRIVATE PRACTICE SOLO AND ACADEMIC PRACTICE (SALAR
 PRIVATE PRACTICE UPPER EXTREMITY
 PRIVATE PRACTICE W/3 ASSOCIATES
 PRIVATE PRACTICE W/MULTIPLE GROUP (SELF EARNED INC
 Private practice, employee -- to be partner in next
 private practice, ortho group, income from self
 PRIVATE PRACTICE-MULTI-SPECIALTY GRP & PRE-PAID/HM
 PRIVATE PRACTICE-ORTHO GROUP AND ACADEMIC PRACTICE
 PRIVATE PRACTICE-ORTHO GROUP-INCOME SELF EARNED
 PRIVATE PRACTICE-ORTHO PAEDIC GROUP AND ACADEMIC PR
 PRIVATE PRACTICE-SOLO AND CORPERATION
 PRIVATE PRATICE - SOLO AND PUBLIC INSTITUTION
 PRIVATE/ACADEMIC INCOME SELF EARNED
 PRIVATE: O ORTH, 2 PM&R
 Pro bono Office--Semi retired
 PROVIDE PRACTICE COMP SOLUTION
 PUBLIC INSTITUTION (SALARY FROM NON-MILITARY GOVT)
 PVT PRACTICE & PART IN ACADEMIA
 PVT PRACTICE ORTHO GROUP, 6 SURGEONS INCOME SELF E
 RAMQ (QUEBEC)
 RED CROSS VOLUNTEER
 research
 RETIRED
 RETIRED
 Retired partially. VAMC 2 days; Tissue bank 3 days
 RETIRED, STILL TEACH
 SALARY - INDEPENDANT MEDICAL EXAMINATION COMPANY

SALARY - MED LEGAL PRACTICE
 SALARY NON PROFIT
 SCOTTISH RITE HOSPITAL
 SELECTED ACAD (FROM ACAD INST)+ACAD (FROM PRIV PRA
 SELECTED BOTH ACAD PRAC OPTIONS (FROM INST+PRIV)
 SELECTED BOTH PP-SOLO + HOSP/MED CTR
 SELECTED PPMULTI + HOSP/MED CTR
 SELECTED PP-OGROUP + ACAD PRAC(SAL FROM PRIV PRAC)
 SELECTED PP-OGROUP + ACADEM
 SELECTED PP-OGROUP+HOSP/MED CTR
 SELECTED PP-OGROUP+PP-MGROU+ACAD(SAL FROM PRIV)
 SELECTED PPSOLO (JUL-DEC 2005) + ACAD (JAN-JUNE 20
 SELECTED PPSOLO + PPOGROUP + WROTE 3MAN COVERAGE S
 SELECTED PPSOLO+OTHER; WROTE:ORTHOPEDIC GROUP (CAP
 SELECTED PUB INST + HOSP/MED CTR
 SELECTED PUBLIC INST, WROTE PART TIME MEDICOLEGAL
 SEMI RETIRED- SURGICAL ASSIST ONLY
 semi-retired 8/05: teach, consult, admin
 SHRINE
 SHRINE HOSPITAL
 SHRINE SYSTEM
 Shriners Hospitals for Children
 SHRINERS HOSP
 SHRINERS HOSPITAL
 SHRINER'S HOSPITAL
 SHRINER'S HOSPITAL
 SHRINERS HOSPITAL AND HOSPITAL/MEDICAL CENTER (SAL
 Shriners Hospitals for Children
 SOLO PVT & HOSP MC SALARY
 surgical assist adult recon-revise knee/hip
 SURGICAL ASSIST ONLY
 SURGICAL ASSISTANCE
 SURGICAL ASSISTANT ONLY
 SURGICAL ASSIST-SPINE
 TEACHING ONLY
 THIRD PARTY PAPERS
 UTILIZATION REVIEW
 V.A. MEDICAL CENTER (6 responses)
 VA - GOV EMPLOYEE
 VA MEDICAL CENTER (VHS)
 VA OUTPATIENT CLINIC VA SALARIED EMPLOYEE-PART TIM
 VA WITH ACADEMIC PROG
 VAH-COMPENSATION AND PENSION EVALUATIONS
 Vet Adm Hospital-Chief of Ortho,with Academic Appointment
 VETERAN AFFAIRS HOSPITAL
 VETERAN COMP & PENSION
 VETERANS ADMIN AT A UNIVERSITY
 VETERANS ADMINISTRATION
 VETERANS HOSPITAL
 VOLUNTEER
 VOLUNTEER - ACADEMIC PRACTICE
 Volunteer at hospital charity orthopedic clinic
 VOLUNTEER AT MIGRANT WORKER CLINIC
 Volunteer work
 WELLNESS & REHAB
 Work as a Medical Director
 WORK FOR STATE COMP FUND
 WORK WITH MULTI-SPECIALTY GROUP 1 DAY PER WEEK
 WORKER COMPENSTATION WITH DA
 WORKERS COMP EVAL
 Workers Comp UR
 WOUND CLINIC

Other Practice Focus

(?) ONTCOMYELITIS (?)
ADULT NEUROMUSCULAR
AEROSPACE MEDICINE
AME-QME
AMPUTATION SURGERY
AMPUTATIONS
ARTHROSCOPIC SURGERY + (IAGH) INTRA-ARTICULAT
GROW
ARTHROSCOPY
Bioethics
BIOMECHANICS
BONE DENSITOMETRY
CARTILAGE
cartilage repair
CAT 1 CME
CEREBAL PALSY
CEREBRAL PALSY
Cerebral Palsy, Stroke
COCCYDYNIA
COMP & PEN EXAMS
COMPENSATION AND PENSION EVALUATIONS (VA)
Complex primary and revision total hip and knee
COMPUTER NAVIGATION
CP, Spina Bifida
DIABETIC FOOT
ENDOSCOPIC CARPAL TUNNEL RELEASE
endoscopy
FORENSIC
FORENSIC
FORENSIC ONLY
FRACTURES
FULL TIME ACADEMIC
GAIT
GAIT ANALYSIS
GERIATRIC CORP
GERIATRIC ORTHO
GERIATRIC ORTHOPAEDICS
GERIATRIC TRAUMA
GOVT (SSI) MED.
HEMOPHILIA, TOTAL JOINT, OSTEOTOMY
Hospital Commander
INDUSTRIAL MEDICINE
infection
INFECTION/OSTEOMYELITIS
INFECTONS
INJURY PREVENTION
KYPHYOPLASTY
MALPRACTICE MLMIC
MALPRACTICE REVIEW
METABOLIC BONE
metabolic bone disease
METABOLIC BONE DISEASE
MICROSURGERY
microsurgery
microsurgery

MICROSURGERY
MICROSURGERY; WRIST SX; NERVE SX; ELBOW SX;
FAILED
MICROVASCULAR SURGERY
MINIMALLY INVASIVE
MINIMALLY INVASIVE ORTHOPAEDIC SURGERY
Musculoskeletal Infection
MUSCLE FLAPS
neurological deformities correction
Neuropathic feet
NEUROPATHY
nonunions/malunions
NUTRITIONAL/HOLISTIC
OR HOPACDIC (?) MEDICINE DIRECTOR - CIGNA
INSURANC
ORTH INFECTIONS BONE AND JOINT INFECTION
OSSATRON
osteomyelitis
OSTEOPOROSIS
OSTEOPOROSIS
OSTEOPOROSIS
OSTEOPOROSIS
osteoporosis
OSTEOPOROSIS
OSTEOPOROSIS SCREEN AND TREATMENT
osteoporosis/metabolic bone disease
OSTEOPOROSIS-HAVE A CENTRAL DX
PAIN CONTROL
PAIN INTERVENTION
PAIN MANAGEMENT
Pain Management
PAIN MANAGEMENT
PAIN MANAGEMENT/MUSCULAR DYSTROPHY
PATHOLOGY CELLUAR ETC
PEER REVIEW
PERFORMING ARTS MEDICINE
PERIPHERAL NERVE
PHARMACEUTICALA RESEARCH
PLASTIC SURGERY
POST-BURN DEFORMITY
posttraumatic elbow
RECONSTRUCTION
RECONSTRUCTION MICROSURG; PERIPHERAL NERVE
SURG
RSD, Chronic pain
SENIOR ASSOCIATE DEAN FOR ACADEMIC AFFAIRS
Skeletal Dysplasia
skeletal muscular pain
SUPERVISE ORTHO PAS PERFORMING COMPENSATION
AND PE
TEACHING ONLY
TENDON TRANSFERS ...
TISSUE BANKING
Tissue Banking
WRIST AND ELBOW

Other Fellowship

3 MONTH FELLOWSHIP IN AEROSPACE MEDICINE; 2.5 YEAR
3 MONTHS ONLY
6 MONTHS CLINICAL VISITOR 2000
AADEP
ABIME
ABIME-AM BD INDEP MED EXAM
ADULT NEUROLOGICAL DISEASE
adult neurology
Aerospace Medicine
AFIP 1974-1976
AMPUTEE
AO
AO
AO fellowship Europe
AO International
AO/ASIF
ASIF - 6 week Fellowship in Operative Treatment of BIOMECHANICS AND CARDIOLOGY
boarded in general surgery
CALCIUM METABOLISM
Cartilage Surgery
Cell biology
cerebral palsy
Cerebral Palsy
CEREBRAL PALSY
COMPENSATION/PENSION EVALUATIONS (VA)
DAH-REHAB
FRCS?
GAIT ANALYSIS
GENERAL SURGERY
HBO WOUND CARE
HIP OSTEOTOMIES
i am also a pediatrician did full residency
ICU
Ilizarov
ILIZAROV
ILIZAROV
ILIZAROV
ILIZAROV
ILIZAROV
ILIZAROV
ILIZAROV
ILIZEROD
ILIZROD
Ilizarod method
IMMUNOLOGY
INFECTION
infections
infectious diseases
Intensive care
kinesiology
LAB OF DEVEL BIOLOGY + ANATOMY
LIMB LENGTH & DEFORMITY
LIMB LENGTHENING

LIMB LENGTHENING
LIMB LENGTHENING
LIMB LENGTHENING
LIMB LENGTHENING & DEFORMITY CORRECTION
LIMB LENGTHENING AND RECONSTRUCTION
MEDICAL ACUPUNCTURE
MED-LEGAL W/C
Method of Ilizarov
MINI FELLOWSHIP ON ILIZAROV DEFORMITY
MS MEDICAL MANAGEMENT
NA
NERVE RECONSTRUCTION
Neuro rehab
NEUROLOGY
NEUROMUSCULAR DISEASES
NEUROPSYCHIATRY
occupational medicine master degree
OCCUPATIONAL MEDICINE
Occupational Medicine Residency
Occupational Medicine-Both Mini Fellowships
ORTHO PATHOLOGY
ORTHOP. FELLOWSHIP
ORTHOAEDIC TEACHING
ORTHOPEDIC SURGERY
osteotomy
PAIN CLINIC
PAIN INTERVENTION
PATHOKINESIOLOGY
pelvic and acetabular fractures
PELVIC AND ACETABULAR FXS
PERIPHERAL NERVE & NEUROSURGERY
PERIPHERAL VASC.
PLASTIC SURGERY
PLASTIC SURGERY
PLASTIC SURGERY
PLASTIC SURGERY
Polio15
PUBLIC HEALTH
REIMPLANTATION
SPORTS, DANCE (BALLET)
STROKE REHAB
SURGICAL INFECTIOUS DISEASES
SURGICAL REHABILITATION SPINAL CORD
TEACHING
TEACHING
Teaching medicine to medical professionals
TEACHING ORTHOPAEDICS ANATOMY PATHOLOGY
TORT MEDICAL LEGAL
TURES
UNREADABLE
Will complete 6/2004
WOUND CARE AND HYPERBORIS MED
WROTE: 4 WKS MINI FELLOWSHIP

2006 OPUS and AAOS Member Census Methodology

The "2006 Orthopaedic Practice in the US" (OPUS) report reflects a number of changes in data collection and the sample analyzed from the AAOS Member Census (census). These changes result in a report that is not directly comparable with previous OPUS reports, but which reflect a change in viewpoint toward identifying the orthopaedic workforce. In subsequent years, these changes will provide a more complete picture of the orthopaedic workforce in the US.

Data Collection Strategy

The first change to impact on the current report was in the procedures used in the collection of member data. Members were provided the opportunity to go online in December 2005 to complete their census forms. Members from membership categories 3 thru 8 (excludes Residents as the census questions are not applicable to Residents) who had not responded online by early January were included in the initial mailing of 24,653. The population split between members who had (respondent) and had not responded (non-respondent) to the 2004 census. Non-respondents were tracked by those eligible to participate in the 2004 census and those not members at that time. Contact letters sent to the non-respondents noted they had not updated their member information in 2004 and specifically requested they do so. All members received the initial census via fax or mail, when no fax number was available. Regular reminders to respond to the census were posted in the "Headline News" and the "AAOS Report." Members were personally re-contacted or re-sent the census forms four times before data collection ended on May 9, 2006.

Distribution of the initial sample is shown below.

Tracking by Member Category		Full AAOS Membership Mailing			
		Non-Respondents 2004		Respondents 2004	TOTAL
		Not in 2004 Pop	In 2004 Pop		
2	Resident Member	5	-		5
3	Candidate Member Practitioner	1,069	376	512	1,957
4	Candidate Member Practitioner	2	52	133	187
5	Applicant Associate Member	5	8	9	22
6	Nonmember Practitioner	285	1,516	513	2,314
7	Fellow	37	6,642	9,905	16,584
8	Emeritus	1,718	840	791	3,349
	Unknown	51	118	66	235
TOTAL		3,172	9,552	11,929	24,653

Response Rates

The overall response rate for the 2006 Census was 53.6%, and reflects a continued decline in member response to the biannual census since 1988. Total number of responses received by member classification and 2004 census response category are shown below, followed by the response rate for each of these groups. Response rates of greater than 100% reflect membership category changes between the initial mailing and the data cut-off.

Members who responded in 2004 responded in higher proportion than those who did not respond in 2004. However, the strategy to identify 2004 non-respondents resulted in one in three responding in 2006. On the other hand, an identical proportion who responded in 2004 chose not to respond in 2006, thus balancing out the gain.

Tracking by Member Category		Final Response: May 9, 2006			TOTAL
		Non-Respondents 2004		Respondents 2004	
		Not in 2004 Pop	In 2004 Pop		
2	Resident Member		3		
3	Candidate Member Practitioner	581	53	125	759
4	Candidate Member Practitioner	2	80	258	340
5	Applicant Associate Member	5	30	21	56
6	Nonmember Practitioner	39	266	218	523
7	Fellow	27	2,440	6,984	9,451
8	Emeritus	1,070	308	630	2,008
	Emeritus/Missing/Unknown	27	18	40	85
TOTAL		1,754	3,195	8,276	13,225

Final Response Rate: May 9, 2006

Member Category	Non-Respondents		<u>Respondents</u>	TOTAL
	<u>Not in 2004</u>	<u>In 2004</u>		
	Pop	Pop	2004	
Resident Member	60.0%			60.0%
Candidate Member Practitioner	54.3%	14.1%	24.4%	38.8%
Candidate Member Practitioner App for Fellowship	100.0%	153.8%	194.0%	181.8%
Applicant Associate Member	100.0%	375.0%	233.3%	254.5%
Nonmember Practitioner	13.7%	17.5%	42.5%	22.6%
Fellow	73.0%	36.7%	70.5%	57.0%
Emeritus	62.3%	36.7%	79.6%	60.0%
Emeritus/Missing/Unknown	52.9%	15.3%	60.6%	36.2%
TOTAL	55.3%	33.4%	69.4%	53.6%

OPUS Sample Changes

It is believed, based on comments on some census forms, that among the reasons members may not respond every two years is they find their practice has not changed in any substantial way. Hence, a decision to include members who had responded in 2004 but did not respond in 2006 into the analysis sample for the 2006 OPUS report resulted in the somewhat larger sample and higher representativeness of the total population.

Further analysis of the respondents showed that one in three members in the Emeritus membership category is still practicing orthopaedic medicine either part or full time. This represents 19% of the total members in this category. For the past 18 years (nine census reports), the OPUS has been based on only board certified, actively practicing members in the Fellows category. Further discussion of the logic for including Emeritus members in the 2006 report resulted in a decision to include the full orthopaedic workforce (members who are candidate members, nonmember practitioners, Fellows and Emeritus members) who responded in either 2004 or 2006 to the Member Census in the analysis database for the 2006 OPUS report. The result is a database of 16,696 members, of which 82% (n=13,679 are board certified and currently practicing part or full time orthopaedic medicine in the United States. This compares to an analysis sample of 10,680 Fellows in the 2004 OPUS report, and represents 60% of the board certified orthopaedic surgeons in the AAOS member database in April 2006. In addition, the database includes 1599 members who are retired and can be analyzed for demographics of this aspect of the orthopaedic workforce.

ALL Respondents

	Year Responded		
	<u>2006</u>	<u>2004</u>	<u>Total</u>
Candidate Member Practitioner	759	148	907
Candidate Member Practitioner Appl for Fellowship	340	113	453
Applicant for Fellowship	56	11	67
Nonmember Practitioner	523	250	773
Fellow	9451	2854	12,305
Emeritus	<u>2008</u>	<u>183</u>	<u>2,191</u>
TOTAL	13,137	3,559	16,696

OPUS Respondents

	Year Responded		
	<u>2006</u>	<u>2004</u>	<u>Total</u>
Candidate Member Practitioner	42	39	81
Candidate Member Practitioner Appl for Fellowship	340	113	453
Applicant for Fellowship	55	11	66
Nonmember Practitioner	159	29	238
Fellow	9223	2833	12,056
Emeritus	<u>617</u>	<u>168</u>	<u>785</u>
TOTAL	10,436	3,243	13,679

The 2006 OPUS sample represents 63% of board certified orthopaedic surgeons, and 74% of board certified orthopaedic surgeons in their prime practice years (Fellows).

Board Certified Orthopaedic Surgeons

	Orthopaedic Surgeon Workforce		
	OPUS Sample	ABOS Certified	% of Certified
Candidate/Applicant	600	826	72.6%
Nonmember Practitioner	238	955	24.9%
Fellow	12,056	16317	73.9%
<u>Emeritus</u>	<u>785</u>	<u>3795</u>	<u>20.7%</u>
TOTAL	13,679	21,893	62.5%

Data Processing

Individual response forms were returned either electronically or on paper. Paper forms are scanned and the forms are stored for two years. All responses are combined, cleaned, tabulated, and analyzed by staff of the AAOS Department of Research and Scientific Affairs. The electronic data files include a record ID associated with individual members to allow transfer of confidential information into the AAOS member database. All data files remain confidential by the Research Department.

Data Cleaning

Respondents to the AAOS Member Census often leave items blank in their submitted census. This practice sometimes indicates a lack of data that must be analyzed as missing. However, in some instances, responses appear to have been left out because the respondent believes a response to another item infers the response to the missing item. Hence, for some variables, such as work status, the member status has been inferred from responses to other variables. Listed below are variables for which in-fill was inferred and the reference variables used in this inference.

Work status (full, part time, retired) : When missing, pulled from 2004 status if retired, or inferred from a combination of reported age at retirement; hours worked per week (40 or more=full time; 1 to 39=part time); procedures performed each month (if provided); gross or net income (if provided); anticipated retirement age in 2004; practice type.

Age: Age is pulled from known date of birth information in the TIMMS records of members.

ABOS certification: ABOS year of certification is pulled from known information in the TIMMS records of members. ABOS status is based on year of certification.

ABOS re-certification: If respondent is currently not certified, ABOS re-certification was set to '0'.

Specialization and focus areas: Variables were back filled with open-ended responses when open response fit an existing category or categories. Respondents who reported being 'general orthopaedist' were assumed to focus in 'general orthopaedic practice,' along with other identified focus areas.

Practice type: Practice type related solely to members in private practice and is developed from responses to the practice setting item.

Income (gross and net): All reported income levels above \$1,000,000 were analyzed for work status and total hours worked. If the respondent worked part time (< 40 hours per week), the income reported was converted from millions to thousands. Note: the income items are formatted to be reported in 000s, but allow six additional digits in the response. Members occasionally report their income as millions rather than thousands (e.g., part time practice with income of \$106,000,000 is assumed to be intended as \$106,000).

Income levels reported above \$3,600,000 were set to system missing variables (approximately the top 0.5% of responses). It was assumed income above this level was entered as either an error or included income from other than the practice of orthopaedics.

Additional cleaning of responses included measures required to fit data into appropriate response categories or identify data as missing.

Differences Found Between the 2004 and 2006 Responses

Statistically significant differences between the members in the 2004 and 2006 response groups include the following item responses. Statistically significant differences in responses occur frequently with large sample sizes such as the census. This is true of the responses between the 2004 and 2006 data sets for the majority of items examined. However, statistical

significance does not imply substantive difference. Substantive differences in responses are noted where they are believed to exist.

- The distribution of members by member category differs in a range from 0.2% to 1.0% between 2004 and 2006 respondents. The overall distribution in member categories is very similar, with Fellows representing 87.4% of the 2004 respondents included and 88.46% of the 2006 respondents. Significantly different at $\alpha=.000$.
- The mean age of respondents in 2006 (51.6 years) is slightly older than for respondents in 2004 (50.6 years). This is most likely due to the increased number of Emeritus members included in the sample, as 33% of Emeritus members responding are still in active practice. Significantly different at $\alpha=.000$.
- A significantly higher proportion, both statistically and substantively, of female orthopaedists responded to the census in 2004 than in 2006. Among the 901 female orthopaedists in the sample, representing 6.6% of the total respondents included in the analysis database, 61% are included from the 2004 response group. Significantly different at $\alpha=.000$.
- The distribution of respondents by regional division is statistically significant due to sample size. The absolute difference in sample distribution ranges from 0.1% to 2.0% between the 2004 and 2006 samples and is not substantively different. Significantly different at $\alpha=.01$.
- The following specialty focus areas show statistically significant differences in representation between the 2004 and 2006 samples:
 - Arthritis (50.5% vs 46.4%); $\alpha=.000$
 - Adult spine (17.3 vs 14.1%); $\alpha=.000$
 - Disability/legal orthopaedics (11.1% vs 9.6%); $\alpha=.006$
 - Foot and ankle (25.0% vs 17.0%); $\alpha=.000$
 - General orthopaedics (36.8% vs 29.0%); $\alpha=.000$ [category added in 2006; back filled from practice specialty area]
 - Hand (28.4% vs 20.4%); $\alpha= .000$
 - Office orthopaedics (0.3% vs 1.0%); $\alpha=.000$
 - Orthopaedic oncology (3.9% vs 1.6%); $\alpha=.000$
 - Other focus area (8.8% vs 1.2%); $\alpha=.000$
 - Pediatric orthopaedics (14.1% vs 9.9%); $\alpha=.000$
 - Pediatric spine (7.0% vs 4.5%); $\alpha=.000$
 - Rehabilitation (4.7% vs 1.5%); $\alpha=.000$
 - Shoulder (44.7% vs 33.6%); $\alpha=.000$
 - Sports medicine (45.2% vs 39.6%); $\alpha=.000$
 - Total joint (9.2% vs 36.1%); $\alpha=.000$ [category added in 2006; back filled from open responses for 2004]
 - Trauma (37.1% vs 24.0%); $\alpha=.000$

The only focus areas not showing statistically significant different representation are adult hip and adult knee. Focus areas with substantive differences are foot and ankle, general orthopaedics (new in 2006), hand, other focus area (responses in 2006 were more reflective of the categories listed); pediatric orthopaedics, rehabilitation, shoulder, total joint (new in 2006), and trauma.

- The distribution of respondents by race was significantly different, with White representing 89.1% in 2004 versus 91.0% in 2006. The race reflecting the greatest change in representation in 2006 was African American, dropping from 2.2% to 1.3% of respondents. Significantly different at $\alpha=.000$.
- Part time work status increased from 8.3% in 2004 to 12.3% of the 2006 sample. Significantly different at $\alpha=.000$.
- Mean hours reported worked each week dropped to 56.3 in 2006 from 59.7 in 2004. Significantly different at $\alpha=.000$.
- The distribution of the proportion of patients by payor source was significantly different for three of the six categories (private pay, Medicare, and other/worker's comp/pro bono). The absolute difference in proportion distribution ranges from 0.2% to 2.7% between the 2004 and 2006 samples and is not substantively different. Significantly different at $\alpha=.000$.
- The distribution of the proportion of time spent in various orthopaedic related activities was significantly different for all five categories. The absolute difference in proportion distribution ranges from 2.7% (clinical practice) to 11.0% (other activities). In part, these aberrations are the result of total time allocation reported summing to more or less than 100%. The data cleaning removed all responses where the sum total range of time allocations for all five categories was less than 90% and more than 110%. Individual category allocations remained unchanged. The overall means of individual categories and total time allocation equal 100%. Significantly different at $\alpha=000$.

Slight differences in reported number of procedures performed were not been calculated due to differences in the item and member responses. In 2004, several procedures did not include the outpatient option; however, respondents noted these in hand written notes. In 2006, all procedures allowed for both out- and in-patient procedures for all listed procedures. However, some respondents include procedures in only one column (both out- and in-patient columns were used), while other respondents split their procedures between the two categories. Analysis of the procedures data notes these differences in response.

2006 Census Response Rate for Board Certified Orthopaedic Surgeons Rate by State

	2006 Census Respondents	Membership Database	% responding
Alaska	56	70	80%
Alabama	189	319	59%
Arkansas	110	162	68%
Arizona	245	376	65%
California	1616	2678	60%
Colorado	289	452	64%
Connecticut	207	341	61%
District of Columbia	37	62	60%
Delaware	49	70	70%
Florida	741	1341	55%
Georgia	350	582	60%
Hawaii	65	93	70%
Iowa	141	191	74%
Idaho	93	143	65%
Illinois	513	805	64%
Indiana	275	402	68%
Kansas	128	178	72%
Kentucky	162	258	63%
Louisiana	172	315	55%
Massachusetts	371	595	62%
Maryland	332	513	65%
Maine	87	131	66%
Michigan	364	536	68%
Minnesota	267	414	64%
Missouri	255	389	66%
Mississippi	95	154	62%

	2006 Census Respondents	Membership Database	% responding
Montana	83	116	72%
North Carolina	395	658	60%
Nevada	26	46	57%
Nebraska	101	149	68%
New Hampshire	88	136	65%
New Jersey	419	643	65%
New Mexico	81	136	60%
Nevada	93	154	60%
New York	914	1373	67%
Ohio	487	744	65%
Oklahoma	128	216	59%
Oregon	222	362	61%
Pennsylvania	582	909	64%
Rhode Island	70	108	65%
South Carolina	195	346	56%
South Dakota	42	67	63%
Tennessee	307	485	63%
Texas	876	1333	66%
Utah	120	185	65%
Virginia	376	596	63%
Vermont	45	64	70%
Washington	344	569	60%
Wisconsin	316	462	68%
West Virginia	62	93	67%
Wyoming	46	66	70%
	13,679	21,665	63%