KNOWLEDGE AND PRACTICE PATTERNS OF ONTARIO DENTISTS RELATIVE TO THE NORTH YORK PUBLIC HEALTH DEPARTMENT'S DENTAL PRACTICE GUIDELINES

G.L. Woodward, P.A. Main, J.L. Leake, D.W. Lewis, Y. Miller

COMMUNITY DENTAL HEALTH SERVICES RESEARCH UNIT

QUALITY ASSURANCE
REPORT NO. 13

1996

The Community Dental Health Services Research Unit (CDHSRU) is a joint project of the Faculty of Dentistry, University of Toronto and the Community Dental Services Division, City of North York Public Health Department. It is supported by a grant from the Ontario Ministry of Health (#04170).

Summary

Many studies have shown a high degree of variability in dentists' decision making and have shown that some practices are not supported by the scientific literature. Practice guidelines based on scientific evidence are intended to reduce this variation and indicate which procedures and practice patterns are most appropriate.

The North York Public Health Department's Community Dental Services Division provides dental services to children according to evidence based practice guidelines. The purpose of this report was to compare the evidence used to draft these guidelines with the results of the Ontario Dentists' Survey which investigated dental knowledge and practice patterns of Ontario dentists. Results of this comparison revealed that infection control practices of Ontario dentists generally were consistent with the literature, but preventive and radiographic practices were not consistent with current scientific evidence. Simple statistical analyses revealed that these inconsistencies may be related to the dentist's past and present dental education as well as the dentist's practice characteristics. However, further investigation using multivariate analyses is recommended.

Introduction

Variation in dentists' practice patterns has been well documented in the dental literature. These studies show a high degree of variability in dentists' decisions, leading to uncertain outcomes (Bader & Shugars 1995). Some practices are not supported or are even contra-indicated by the scientific literature. Recent surveys of general dental practitioners by Swan and Lewis (1993a) and El-Mowafy and Lewis (1994) found that many Ontario dentists state that they restore approximal carious lesions that are confined to the enamel. However, scientific evidence in the dental literature indicates that less than half of approximal lesions confined to the enamel will be cavitated and should not be restored (Woodward & Leake 1995). Swan and Lewis (1993b) also reported that many dentists would prescribe radiographs during a 12 month recall appointment of an asymptomatic patient with no clinical evidence of new caries or periodontal disease. Based on this evidence, the restorative and radiographic practices of many Ontario dentists would need to be changed to improve the quality of care.

The North York Public Health Department (NYPHD) operates a publicly funded dental program that offers free dental services to children in need of care. To reduce the amount of variability among dental care providers and to help ensure that they provide appropriate care, practice guidelines have been developed for many of the preventive and treatment services offered by the program. In cooperation with the Community Dental Health Services Research Unit (CDHSRU), these guidelines were recently reviewed and revised according to the scientific evidence available in the health care literature and the epidemiology of the North York child population.

Before the revised guidelines were incorporated into the NYPHD's dental program, they

were subjected to review and approval by two panels. Initially the guidelines were reviewed by an internal (staff) panel of three NYPHD dentists and a NYPHD dental hygienist. Following approval by the internal panel, the recommended guidelines were reviewed by an external panel of individuals for various scientific fields and representatives of the Ontario Dental Association, the Royal College of Dental Surgeons of Ontario, and the North York Public Health Department. To date, these panels have approved guidelines in seven areas, topical fluorides (Woodward & Lewis 1995), pit and fissure sealants (Woodward & Lewis 1993), dental restorative materials (Woodward & Ryding 1993), when to place an initial restoration (Woodward & Leake 1995), space maintainers (Woodward & Leake 1993), dental radiographs (Woodward & Main 1993), and infection control (Main 1993).

The purpose of this report was to compare the knowledge and practice patterns of Ontario dentists to the current scientific evidence, as published in the CDHSRU guideline documents. Because the CDHSRU guideline documents focus on children, this report will be limited to this age group. We also hope to investigate any possible relationships between quality and the demographic factors included in the survey instrument. Hypotheses regarding the relationship between several demographic factors and the dentists' overall knowledge and practice patterns were as follows:

(1) Dentists' stated knowledge and practice patterns would be related to the dentists' year of graduation, years of practice, type of practice, hours of continuing education over the last year, hours per week spent reading professional journals, number of dentists in their practice, number of hours worked per week, number of patients per week, and percentage of patients treated who were children or adolescents.

(2) Dentists' stated knowledge and practice patterns would not be related to the dentists' sex, the school where the dentists received their first dental degree, the population of the community where the dentists practice, the type of dental insurance coverage of the patients, and the number of and hours worked by hygienists, assistants, technicians, and secretaries in the dentists' practices.

Methods

In June 1992, a mail questionnaire, the Ontario Dentists Survey (Appendix 1), was mailed to a randomly-selected group, consisting of one-half of the general dental practitioners in the province of Ontario. A detailed description of the development and mailing of the questionnaire has already been documented by El-Mowafy and Lewis (1994). Data from the returned questionnaires were entered into a personal computer using the data entry program Epi Info (Dean *et al.* 1990). Cleaning and analysis of the data were carried out using the data analysis package SPSS/PC+ (Norusis 1990).

Questions were asked to learn about dentists' general dental knowledge and their patterns of practice regarding radiography, prevention, restorative treatment, and infection control. Demographic questions regarding sex, year and school of graduation, continuing dental education, practice characteristics, patient type, and work load were also asked.

Before beginning any data analysis, we selected a subset of questions from the questionnaire that addressed areas of knowledge and practice in children's dentistry for which there was acceptable scientific evidence according to the CDHSRU guideline reports. Using the findings of the CDHSRU guideline documents, we identified the responses to this subset of

questions that were consistent with current evidence. Although the guideline reports were published in 1993 or later, the literature collected for these reports was limited to articles published in 1992 or earlier, and would have been available to dentists at the time of the survey.

The number of responses per dentist that were consistent with the current evidence was summed for four general areas of dental practice, radiography, prevention, restorative dentistry, and infection control. The summary scores for each of these four areas were then tallied resulting in the overall score, i.e. the total number of responses to all questions that were consistent with the literature. In these calculations all questions were weighted equally, with the response to each question receiving a score of 1 (consistent with the literature) or 0 (not consistent with the literature). However, three of the questions asked dentists to answer with reference to three different patient age groups and the response for each age group was given a weighting of one third. Thus, the score for each these three-part questions could be 0, 1/3, 2/3, or 1. Responses from dentists who did not answer all questions included in a summary score were not included in that summary score or in the overall score. In all analyses, the response "don't know" was considered to be inconsistent with the current evidence.

One-way analysis of variance was used to test for significant differences in the mean overall score according to various demographic variables. Prior to analysis, continuous demographic variables were categorized. When the analysis of variance resulted in a significant F statistic, indicating that significantly different means were present, Scheffe's Multiple Comparison Test was used to determine which means were significantly different. Where appropriate, results of Scheffe's Test were summarized graphically using each category's mean and its 95% confidence interval. Two categories with significantly different means were

identified by assigning them the same letter (see Figures 5-20). During all analyses, significance was defined as a probability of less than 5%, i.e. $p<0.05$.

Results

Questionnaire data on 1276 dentists were received and analyzed. Responses to the selected questions are summarized in Tables 1 to 16 and the response(s) consistent with the current evidence are italicised.

Radiograph Use

Current Evidence: Radiographs only should be prescribed based on the findings of a prior clinical exam and only if the radiograph is expected to aid in diagnosis or treatment (Woodward & Main 1993).

Responses to the radiograph questions indicate that many dentists take routine radiographs of their patients. Although few dentists always take radiographs when examining new patients, most dentists responded that they would take routine radiographs unless previously taken radiographs were provided (Table 1). Only 7.2% of dentists responded that they never routinely take radiographs of new patients which is consistent with the current evidence.

Tables 2 and 3 show the intervals used by dentists when taking recall bitewing radiographs of low and high caries-risk children and adolescents. Most dentists chose intervals between 6-18 months. Generally, the dentists chose longer intervals for older patients and shorter intervals for high caries-risk patients. However, the only response consistent with the current evidence is "no specific interval" because radiographs should only be prescribed immediately following the findings of a prior clinical exam and not a previous appointment. This response

was chosen by 10% or fewer of the responding dentists depending on the age and caries-risk of the patient.

The maximum radiograph summary score was 3, but most dentists had very low scores. Of the 1240 dentists who responded to all three questions, approximately 80% scored zero and less than 2% of dentists scored two or more (Figure 1). The mean radiograph quality score was 0.18 (sd=0.44)), and the median and mode were 0.00.

Table 1. Routine use of radiographs.

Do you routinely take radiographs as part of the initial examination of a new patient?		
Response	Frequency	Percent
No	91	7.2
Yes, Always	48	3.8
Yes, unless the patient provides previously taken radiographs which are no older than:		
3 months	31	2.4
6 months	301	23.7
9 months	76	6.0
12 months	511	40.2
18 months	51	4.0
24 months	106	8.3
36 months	36	2.8
48 months	16	1.3
other	5	0.4
No Response	4	

Table 2. Recall bitewing interval for a low caries-risk child.

Please consider the situation of regular patients in your practice who have been receiving dental care from you for several years. Suppose such patients exhibit no clinical caries on recall, have not had a cavity in 2-3 years, and show no other signs or symptoms of significance.

Please indicate the interval, in months, you would recommend for recall bitewings to be taken for:

Response	a child with primary dentition		a child with transitional dentition		an adolescent with permanent dentition	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
6	116	9.3	110	8.7	56	4.4
9	5	0.4	6	0.5	3	0.2
12	619	49.4	587	46.6	514	40.7
15	3	0.2	9	0.7	16	1.3
16	0	0.0	0	0.0	1	0.1
18	170	13.6	208	16.5	247	19.6
20	0	0.0	0	0.0	1	0.1
21	4	0.3	4	0.3	7	0.6
24	171	13.6	181	14.4	288	22.8
30	12	1.0	19	1.5	22	1.7
33	1	0.1	1	0.1	1	0.1
36	26	2.1	29	2.3	38	3.0
60	0	0.0	0	0.0	1	0.1
no specific time interval	127	10.1	105	8.3	68	5.4
no response	22		17		13	

Table 3. Recall bitewing interval for a high caries-risk child.

Suppose that a few regular patients in your practice exhibit clinical caries on recall. These patients have poor oral hygiene and are known to snack on cariogenic foods.

Please indicate the interval, in months, you would recommend for recall bitewings to be taken for:

Response	a child with primary dentition		a child with transitional dentition		an adolescent with permanent dentition	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
3	1	0.1	1	0.1	2	0.2
4	2	0.2	3	0.2	2	0.2
6	783	61.8	723	57.1	683	53.8
9	25	2.0	22	1.7	24	1.9
12	369	29.1	419	33.1	473	37.2
15	2	0.2	4	0.3	8	0.6
18	31	2.4	43	3.4	46	3.6
24	7	0.6	11	0.9	13	1.0
30	1	0.1	0	0.0	0	0.0
36	1	0.1	0	0.0	1	0.1
no specific time interval	46	3.6	41	3.2	18	1.4
no response	8		9		6	

Prevention

Prevention questions focused on the use of topical fluorides and pit and fissure sealants (Tables 4-9).

Current Evidence: Topical fluorides should be prescribed based on a patient's risk to caries and are not an efficacious means of reducing caries in low to moderate caries-risk patients living in fluoridated areas. Topical fluoride provides more caries protection to the smooth tooth surfaces than the pit and fissure surfaces and also can be used to remineralize incipient enamel caries. A prior prophylaxis does not increase the cariostatic effectiveness of the topical fluoride (Woodward & Lewis 1995).

Dentists' use and knowledge of topical fluorides varied. Reported time intervals between applications generally were inconsistent with the current evidence (Table 4); responses considered to be consistent with the evidence were "no specific time interval" or "not applicable." Consistent with the evidence, most dentists responded that topical fluoride did not protect all surfaces equally (Table 5), providing more protection to the smooth tooth surfaces than the pit and fissure surfaces. Most dentists also responded that early incipient enamel caries can be cured (Table 6). However, over 80% of dentists responded that a prophylaxis is necessary before topical fluoride application to maximize dental caries protection (Table 7), which is contrary to the evidence.

NOTE: Although the authors chose to include "not applicable" as a response consistent with the evidence, this may not be the case for other reports based on these data. Excluding "not applicable" would reduce the mean prevention summary score and the mean overall score.

Current Evidence: Dental sealants are an effective means of preventing pit and fissure caries (Woodward & Lewis 1993). Carious pit and fissure lesions that are properly sealed will not progress (Woodward & Leake 1995).

Knowledge of pit and fissure sealants generally was consistent with the evidence (Tables 8 & 9). Almost 90% of the dentists agreed that sealant effectiveness is scientifically proven (Table 8) and almost 80% of dentists disagreed with the statement that sealing over small fissure lesions would lead to further decay (Table 9).

The maximum prevention score was six and of the 1183 dentists who responded to all six questions, approximately 85% scored three or more, and more than 50% scored four or more (Figure 2). The mean prevention score was 3.57 (sd=1.01) and the median and mode were 4.00.

Table 4. Time interval between fluoride applications.

On average, please indicate the optimal time interval, in months, between topical fluoride treatments for patients aged:						
Response	3-5 years		6-12 years		13-18 years	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
1	1	0.1	1	0.1	0	0.0
3	4	0.3	4	0.3	2	0.2
4	63	5.0	87	6.9	49	3.9
5	2	0.2	2	0.2	2	0.2
6	875	70.0	987	78.7	838	67.3
8	0	0.0	1	0.1	2	0.2
9	8	0.6	8	0.6	13	1.0
12	129	10.3	70	5.6	125	10.0
18	5	0.4	6	0.5	13	1.0
24	1	0.1	1	0.1	0	0.0
no specific time interval	75	6.0	55	4.4	107	8.6
not applicable	87	7.0	32	2.6	95	7.6
no response	26		22		30	

Table 5. Surfaces protected by topical fluoride.

Following a topical fluoride application, all tooth surfaces are equally well protected.		
Response	Frequency	Percent
Strongly Agree	12	1.0
Agree	161	12.8
Disagree	697	55.3
Strongly Disagree	336	26.7
Don't Know	54	4.3
No Response	16	

Table 6. Incipient enamel caries.

Early incipient enamel caries can be cured.		
Response	Frequency	Percent
Strongly Agree	191	15.3
Agree	789	63.1
Disagree	184	14.7
Strongly Disagree	18	1.4
Don't Know	69	5.5
No Response	25	

Table 7. Prophylaxis before topical fluoride application.

To achieve maximum caries prevention for the average patient, it is essential to perform a prophylaxis prior to topical fluoride application.		
Response	Frequency	Percent
Strongly Agree	484	38.3
Agree	550	43.5
Disagree	170	13.4
Strongly Disagree	33	2.6
Don't Know	28	2.2
No Response	11	

Table 8. Sealant effectiveness.

The effectiveness of sealants in preventing caries is scientifically conclusive.		
Response	Frequency	Percent
Strongly Agree	526	41.7
Agree	602	47.7
Disagree	82	6.5
Strongly Disagree	7	0.6
Don't Know	44	3.5
No Response	15	

Table 9. Sealing over pit and fissure decay.

Applying sealants over small fissure lesions in teeth will lead to further decay.		
Response	Frequency	Percent
Strongly Agree	22	1.8
Agree	192	15.3
Disagree	629	50.1
Strongly Disagree	348	27.7
Don't Know	64	5.1
No Response	21	

Restorative

Current Evidence: With regard to dental caries, questionable pit and fissures should not be restored but should receive pit and fissure sealant (Woodward & Leake 1995).

Table 10 shows that 37.3% of dentists responded that they would place a sealant in a questionable occlusal fissure which is consistent with the current evidence. Approximately 41% responded that they would keep the tooth under review which may be the appropriate decision for interproximal caries but is not recommended for pit and fissure caries. As it was the only question included in the score, the results in Table 10 also represent the restorative summary score.

Table 10. Treating questionable occlusal caries.

When examining a twelve year old patient, if you encountered an occlusal fissure which you thought might contain some caries, but which showed no cavitation and exhibited no radiolucency on a bitewing radiograph, would your first action be to:		
Response	Frequency	Percent
Place an amalgam?	27	2.2
Place a preventive resin restoration?	245	19.8
Place a sealant?	462	37.3
Not intervene but keep tooth under review?	506	40.8
No Response	36	

Infection Control

Current Evidence: When treating patients, dentists should use rubber gloves, protective eyewear, and a facemask. After each use, handpieces and burs should be sterilized using a hot air oven, autoclave, or chemiclave (Main 1993).

The responses shown in Tables 11, 12, and 13, indicate that most dentists' reported use of barrier techniques was consistent with the current evidence. Over 90% of dentists reported that they always used rubber gloves, slightly fewer (87.1%) always used protective eyewear, and 73.2% responded that they always used a facemask.

A majority of dentists also reported sterilization practices that are consistent with the current evidence. Over 70% of dentists responded that they used a hot air oven or an autoclave or chemiclave to sterilize burs, and slightly fewer (65%) responded that they used one of these methods to sterilize handpieces (Tables 14 & 15). However, dentists were allowed to chose more than one response to these two questions (Table 14, n=1369; Table 15, n=1400) and some also responded that they used disinfectant to sterilize burs and handpieces which is inconsistent with the evidence. Assuming that an acceptable and unacceptable method were not used in

combination, i.e. disinfectant followed by an autoclave, chemiclave, or hot air oven, dentists reporting the routine use of both methods were considered to be using sterilization practices inconsistent with the evidence. This reduced the frequencies of the responses consistent with the current evidence to 68.1% for bur sterilization and 57.3% for auto/chemiclave for handpiece sterilization.

Responses found in Table 16 indicate that two-thirds of dentists reported autoclaving or chemiclaving their handpieces after each use which is consistent with the evidence. Compared to the other two sterilization questions (Tables 14 & 15), many dentists (12.9%) did not respond to this question, most likely because they felt it did not apply, i.e. they did not use auto/chemiclaves routinely. If these non-responders are included in the analyses, the percentage of responses consistent with the literature falls to 58.0% which is very similar to the percentage of dentists using only a hot air oven and/or auto/chemiclave for handpiece sterilization.

The infection control summary scores were much higher than the radiograph or prevention scores. Of the 1098 dentists responding to all six questions, approximately one third scored the maximum of six, and less than 10% scored less than three (Figure 3). The mean infection control summary score was 4.55 (sd=1.43) and the median and mode were 5.00 and 6.00, respectively.

Table 11. Use of rubber gloves.

Do you use rubber gloves when treating your patients?		
Response	Frequency	Percent
Always	1153	90.7
Usually	59	4.6
Sometimes	50	3.9
Rarely/Never	9	0.7
No Response	5	

Table 12. Use of protective eyewear.

Do you use protective eyewear when treating your patients?		
Response	Frequency	Percent
Always	1101	87.1
Usually	78	6.2
Sometimes	49	3.9
Rarely/Never	36	2.8
No Response	12	

Table 13. Use of facemasks.

Do you use a facemask when treating your patients?		
Response	Frequency	Percent
Always	925	73.2
Usually	73	5.8
Sometimes	173	13.7
Rarely/Never	92	7.3
No Response	13	

Table 14. Methods of sterilizing burs.

Which of the following methods do you routinely use for sterilization of burs used for restorative work? (Note: dentists were allowed to chose more than one method)		
Response	Frequency	Percent
Cold sterilization by wiping burs with disinfectant-soaked napkin.	34	2.7
Cold sterilization by immersing the burs in a disinfectant solution for a period of time.	281	22.3
Hot air oven.	61	4.8
Autoclave or chemiclave.	869	69.0
Other	107	8.5
No Response	17	

Table 15. Methods of sterilizing handpieces.

Which of the following methods do you routinely use for sterilization of slow and high-speed handpieces used for restorative work? (Note: dentists were allowed to chose more than one method)		
Response	Frequency	Percent
Cold sterilization by wiping burs with disinfectant-soaked napkin.	359	28.5
Cold sterilization by immersing the burs in a disinfectant solution for a period of time.	141	11.2
Hot air oven.	20	1.6
Autoclave or chemiclave.	800	63.4
Other	65	5.2
No Response	15	

Table 16. Frequency of handpiece sterilization using an autoclave or chemiclave.

If you are routinely using an autoclave or chemiclave for sterilization of handpieces, how frequently do you sterilize them using this method?		
Response	Frequency	Percent
After each use	740	66.6
Twice a day, however, cold sterilization is used after each use	86	7.7
Once a day, however, cold sterilization is used after each use	69	6.2
Once a week, however, cold sterilization is used after each use	17	1.5
Not applicable	199	17.9
No Response	165	

Overall Score

Using the summary scores from the radiograph, prevention, restorative, and infection control sections we calculated an overall score for the total number of each dentists' responses that were consistent with the evidence. Approximately 23% (n=290) of the dentists did not respond to one or more of the questions and were excluded from this score. Figure 4 shows the distribution of the overall score for those dentists who responded to all questions (n=986). Approximately 73% of the dentists scored 8 or more out of the maximum 16. No individuals scored 16 and only 5% scored 12 or more. The mean, median, and mode overall score were 8.66 (sd=2.00), 9.00, and 9.00, respectively.

Demographic Factors

Dentist's Sex

The mean overall score of males and females was not found to be significantly different.

Graduation

After categorizing year of graduation into 5 year increments, we found a significant relationship between the overall score and year of graduation. However, the relationship was not linear, as only those individuals who graduated in 1965 or earlier had significantly lower scores based on the results of the Scheffe's Test. Using the letters "a" through "h", Figure 5 shows categories that, based on Scheffe's Test results, were found to be significantly different; categories with the same letter are significantly different. For example the categories of 1961-65 and 1976-80 both have been assigned the letter "f" indicating that they are significantly different.

We also found the mean overall scores to be associated with the university from which the dentist obtained his/her first degree. Figure 6 indicates that dentists who graduated from the University of Western Ontario had significantly higher scores than dentists from all other universities. However, U.W.O. did not graduate its first class of dentists until 1972. When we analyzed only dentists who graduated after 1971, the results of Scheffe's Test indicated that the mean score for U.W.O. dentists' differed significantly from only the mean score of dentists from non-Canadian universities.

Continuing Education

Dentists who reported that they had attended any lectures, continuing education courses,

conferences, workshops, or study clubs related to dentistry scored significantly higher (mean=8.7, sd=1.9) than dentists who did not (mean=7.6, sd=2.4). However, of those individuals who did participate in some form of continuing education (1 or more hours), no significant relationship was found between the overall score and the numbers of hours of participation (Figure 7). We also found no association between the overall score and the number of hours spent by the dentists reading professional journals, newspapers, books, and papers.

Practice Characteristics

A relationship was found between the total score and the type of dental practice. General practitioners scored significantly lower than dentists who practised in public health clinics (Figure 8), although the 95% confidence intervals of the general practitioners and public health dentists were very different. The difference in confidence intervals was due to the very different sample sizes, as the variance of the general practitioners' mean (n=946, s^2=3.96) was very similar to that of the public health dentists' (n=17, s^2=3.57). Specialists were not included in the analyses due to an insufficient sample size of those who answered all 16 questions (n=5). Of the general practitioners, those who had solo practices had a lower mean overall score than dentists who practised in a partnership or with an associate (Figure 9). We did not find a significant relationship between the overall score and the number of dentists working in the practice, but did find a significant relationship between the overall score and the total number of hours worked by all dentists in the practice (Figure 10); however, results of the Scheffe's Test did not indicate that any of the category means differed significantly. We also found no significant relationship between the overall score and the hours per week that the responding dentist spent practising dentistry.

Analysis of variance also revealed a significant relationship between the overall score and number of patients per week; dentists with very many or very few patients per week had higher overall scores. However, Scheffe's Test did not identify any significant differences among the various categories (Figure 11). Similarly, no significant relationship was found between the overall score and the responding dentist's satisfaction with his or her workload.

The overall score also was found to be related to the number of years practising dentistry. However, this effect was mostly the result of dentists who had been practising more than 25 years (Figure 12). The results of Scheffe's Test indicated that no significant difference in overall score existed among the dentists who had been practising 25 years or less.

Dentists who practised in smaller communities (population less than 500,00) had significantly higher overall scores than dentists from communities with populations over 500,000 (Figure 13).

When we investigated the relationship between support staff and the overall score we found a number of significant relationships. The overall score was found to be significantly related to the number of hygienists (Figure 14), assistants (Figure 15), and secretaries/receptionists (Figure 16) working in the responding dentist's practice. In general, practices without the services of these staff members had lower mean overall scores. Significant relationships were also found between the overall score and the total hours worked in the responding dentist's practice by hygienists (Figure 17), assistants (Figure 18), and secretaries/receptionists (Figure 19). However, we found no significant relationship between the overall score and the number of dental technicians in the practice nor the total number of hours they worked per week.

Patient Type

Overall scores were related to the percentage of a dentist's patients who were under 13 years of age (Figure 20), but we found no relationship between the overall score and the percentage of patients who were between the ages of 13-20 years.

No significant relationship was found between the overall score and the percentage of each dentist's patients whose costs were fully or partially covered by either private insurance or a public plan or who were not covered by any third party and paid their own dental expenses.

Discussion

The results of this survey indicate that the knowledge and clinical practices of most Ontario dentists are not highly consistent with the current scientific evidence found in the dental literature. Although their knowledge and practice of infection control generally was consistent with the evidence, their knowledge and practices in the areas of prevention and radiography were not. Dentists' knowledge and practices for all categories combined was found to be related to a number of demographic variables, especially the dentists' practice (office) characteristics and education.

Education was found to be associated with the overall score but the relationship was not entirely as expected. Although the more senior dentists had the lowest mean scores, recent graduates scored no better than dentists who graduated 15 to 20 years earlier. Individuals who attended some form of continuing education had overall scores approximately one point higher than those who did not attend some form of continuing education. However, neither the hours of continuing education nor the hours spent reading professional publications were associated

with the dentist's overall score.

Almost all dentists indicated that they take radiographs at a predetermined interval, depending on the patient's caries risk and age. This is not consistent with Healing Arts and Radiation Protection Guidelines (Ontario Ministry of Health 1987) but is consistent with the recommendations of the American Dental Association (ADA Council on Dental Materials, Instruments, and Equipment 1989), which were subsequently reviewed in the Journal of the Canadian Dental Association (Stephens & Kogon 1990). The American Dental Association (1989), as well as Stephens and Kogon (1990) recommend that radiographs should only be prescribed after a clinical exam, should only be prescribed if they will aid in diagnosis and treatment, and should be based on the risk/benefit concept, clinical indicators, and patient history; using radiographs to screen for developmental anomalies or occult diseases is not justified. However, the articles also recommend regular intervals for taking radiographs to detect dental caries based upon the patient's age and caries-risk. For children, the recommended interval was 12-24 months for low risk individuals and 6-12 months for high risks individuals. For low and high caries-risk adolescents these intervals were increased to 18-36 months and 6-24 months, respectively.

At the time this survey was carried out, at least three studies had been published that showed that a prior prophylaxis is not necessary to maximize the cariostatic effect of a professionally applied topical fluoride. However, most dentists still believe that a prior prophylaxis is necessary. Most dentists also reported that they provide the traditional biannual application of topical fluoride, but the dental literature recommends that topical fluorides be provided to only high caries-risk individuals. Based upon recent dental caries statistics for

Ontario, only a small percentage of the population would qualify as high risk (Leake & Main 1995), especially in areas surrounding Toronto (Woodward *et al.* 1995, O'Keefe 1995). Although not available at the time of this survey, a recently published study of high caries-risk children by Johnston and Lewis (1995) found a biannual application of topical fluoride to be no more effective at preventing caries than an annual application.

The methods and knowledge of infection control were quite high for all dentists. Most dentists report that they always use gloves and protective eyewear when treating patients. However, the findings that many dentists do not use facemasks and are still using cold sterilization for their burs and handpieces should be of concern to the dental profession.

Dentists who practised in public health clinics had a higher mean overall score than general practitioners, although the difference was less than two points, 8.7 versus 10.1. This result could be attributed to the NYPHD's dentists whose practice guidelines are based on the evidence reported in the CDHSRU guidelines documents. These dentists also attend regular meetings with program managers where current evidence is disseminated. The higher scores of public health dentists, who primarily treat children, may account for the significant but small increase in the overall score as the percentage of patients who are under 13 years of age increases. Children in this age category represent the vast majority of the NYPHD's clients.

We expected that dentists who practice with associates or in a partnership would score higher than solo-practice dentists because of the increased opportunity to share information and problems with colleagues. Based on similar reasoning, we predicted that the overall score would be related to the number of dentists in the responding dentists' practice, as well as the number of hours worked per week by these dentists. Although these hypotheses were accepted, the

effects were small. Overall scores of dentists in partnerships or associateships were less than one point greater than scores for dentists in solo-practice. Overall scores were also found to vary significantly with the total hours worked per week by all dentists in the responding dentist's practice, but Scheffe's Test did not identify any significantly different categories. The number of dentists in the practice and the number of hours worked per week by the responding dentist were not related to the overall score.

While the effect was small, the number and hours worked by hygienists, assistants, and secretaries/receptionists was positively related with the overall score. Holloway and Clarkson (1994) recently reported that a sample of English dentists had greater mean "preventive awareness scores" if their practice employed a hygienist.

The dentists' overall score also was found to vary slightly with a number of other demographic factors, such as community size and practice work load. Interpretation of these findings is difficult due to possible confounding with other variables. The relatively simple bivariate analyses carried out for this report does not control for the possible effects that interrelated demographic variables may have on their relationship with the overall score. For example, the dentist's year of graduation and years practicing will be highly correlated and the years practicing may also be related to many other practice characteristics such as the number of dentists and staff working in the dental practice. Therefore, results of the bivariate analyses should be interpreted cautiously.

Further investigation of these data using multivariate techniques to determine the principle demographic factors affecting the dentists' knowledge and practice patterns is recommended. However, such an analysis would be most suited to a subset of the data included in this report,

as calculation of our overall score reduced the original sample size 23%, from 1276 to 986 dentists. This number will be further reduced as various demographic factors are included in the multivariate model, assuming the response rate to the demographic questions is not 100%. Thus, the validity of a multivariate model including this study's overall score and all of the significant demographic variables could be questioned.

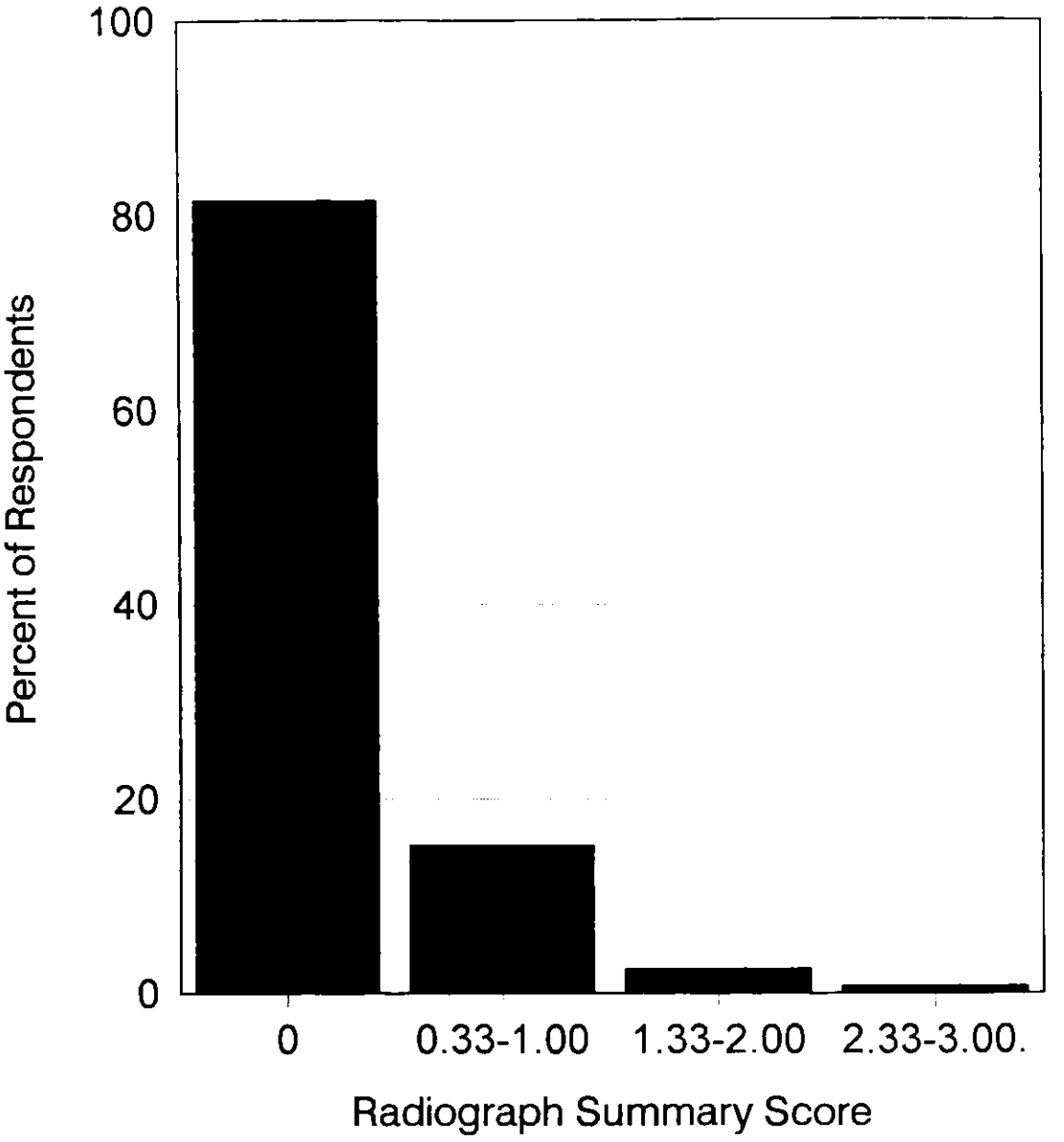

Figure 1 Distribution of the radiograph summary score.

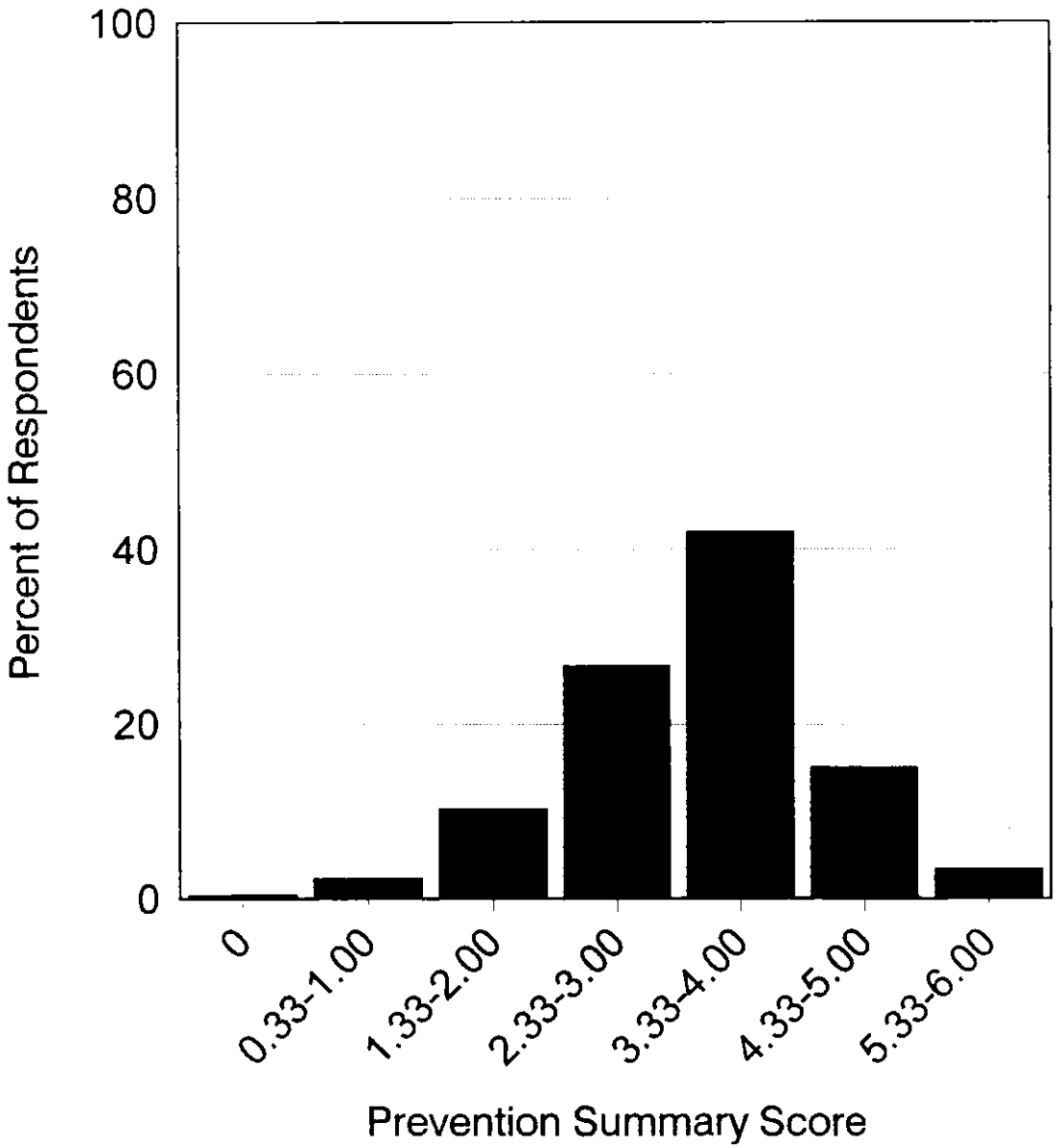

Figure 2. Distribution of the prevention summary score.

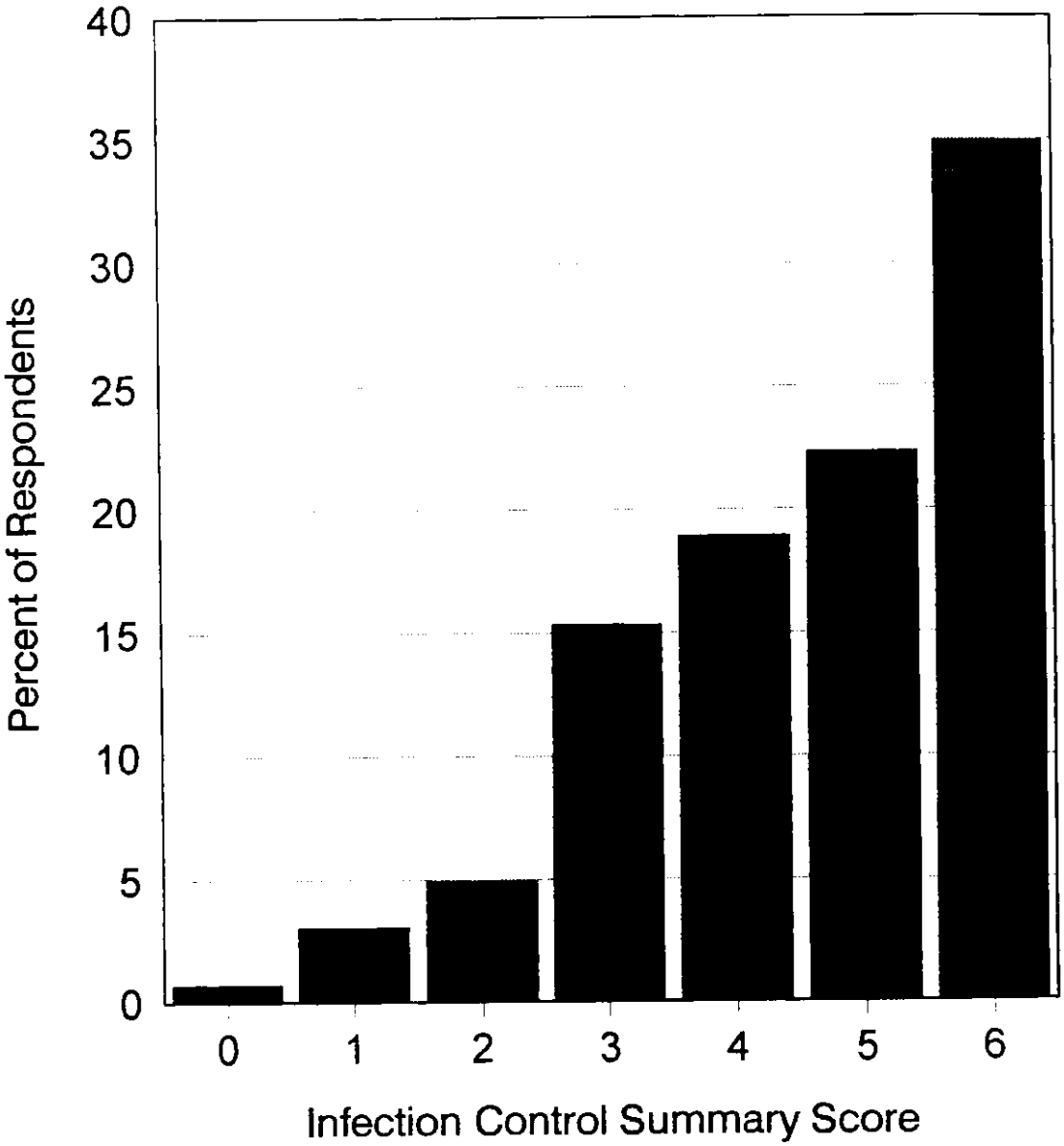

Figure 3. Distribution of the infection control summary score

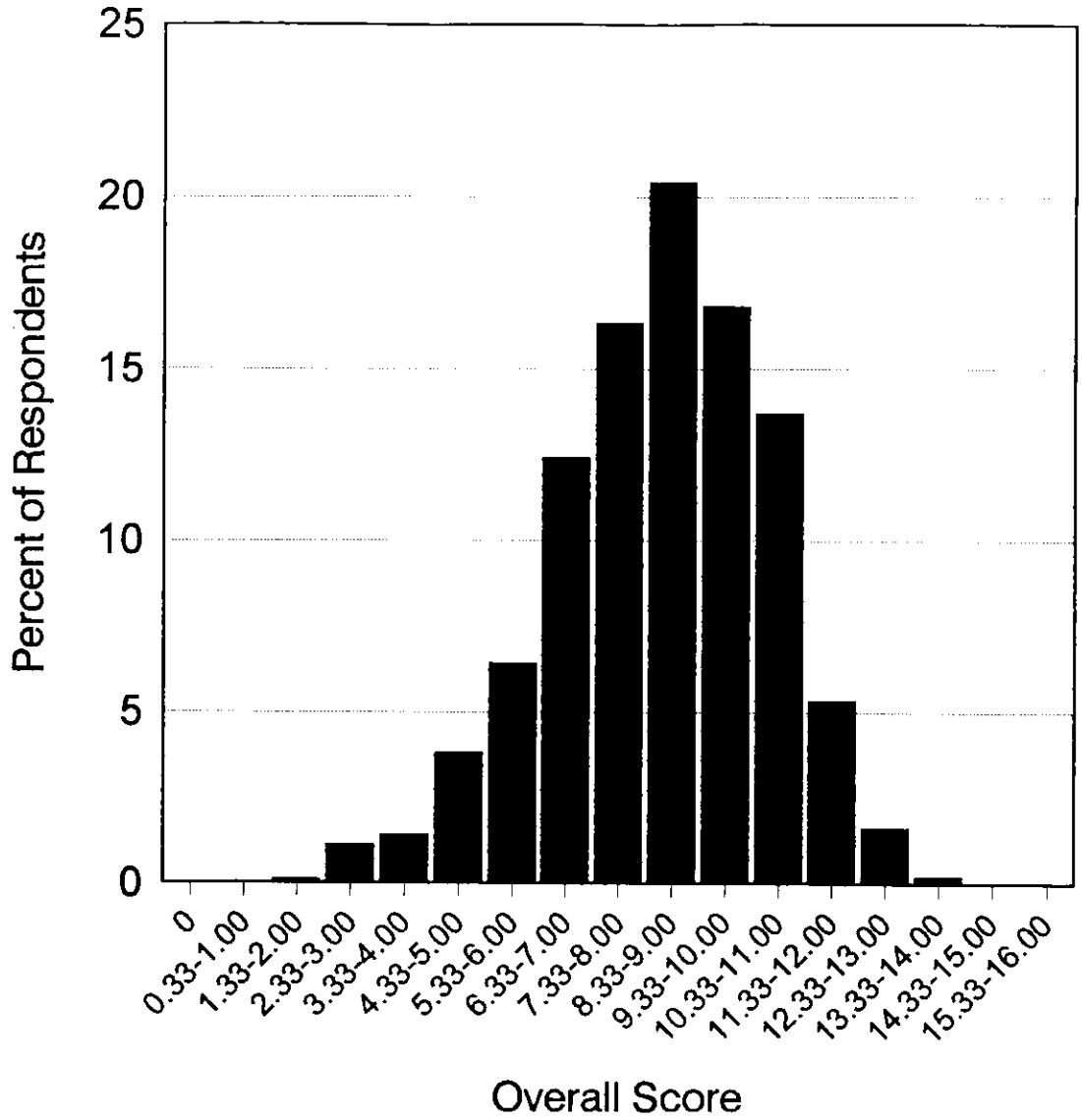

Figure 4. Distribution of the overall score.

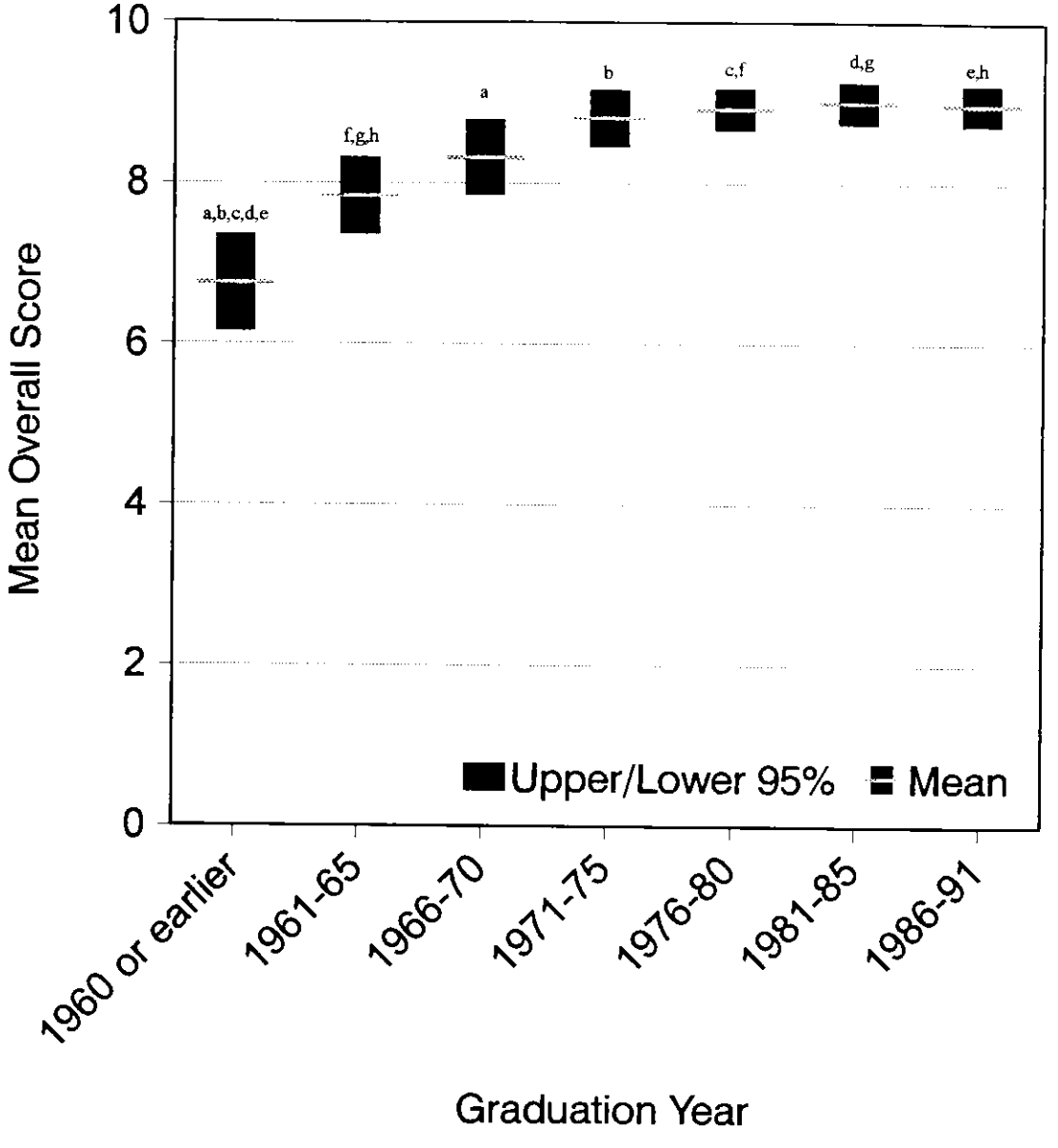

Figure 5. Mean overall score by year of graduation
(a-h denote significantly different means, Scheffe's Test, $p>0.05$).

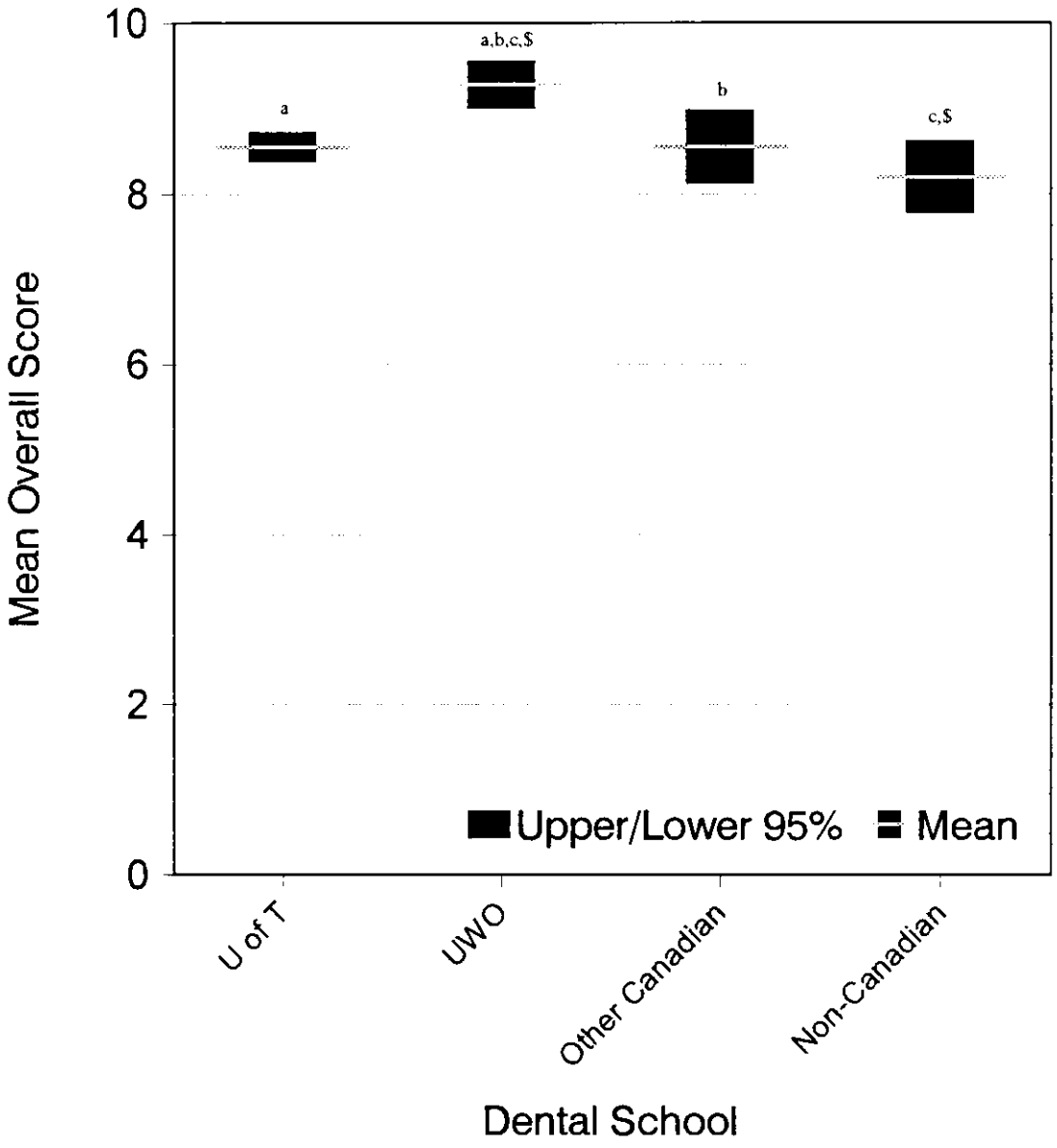

Figure 6. Mean overall score by dental school
(a-c denote significantly different means, Scheffe's Test, $p<0.05$)
($ denotes significantly different means after removal from the analysis of individuals who graduated before 1972, the year U.W.O. graduated its first dental class).

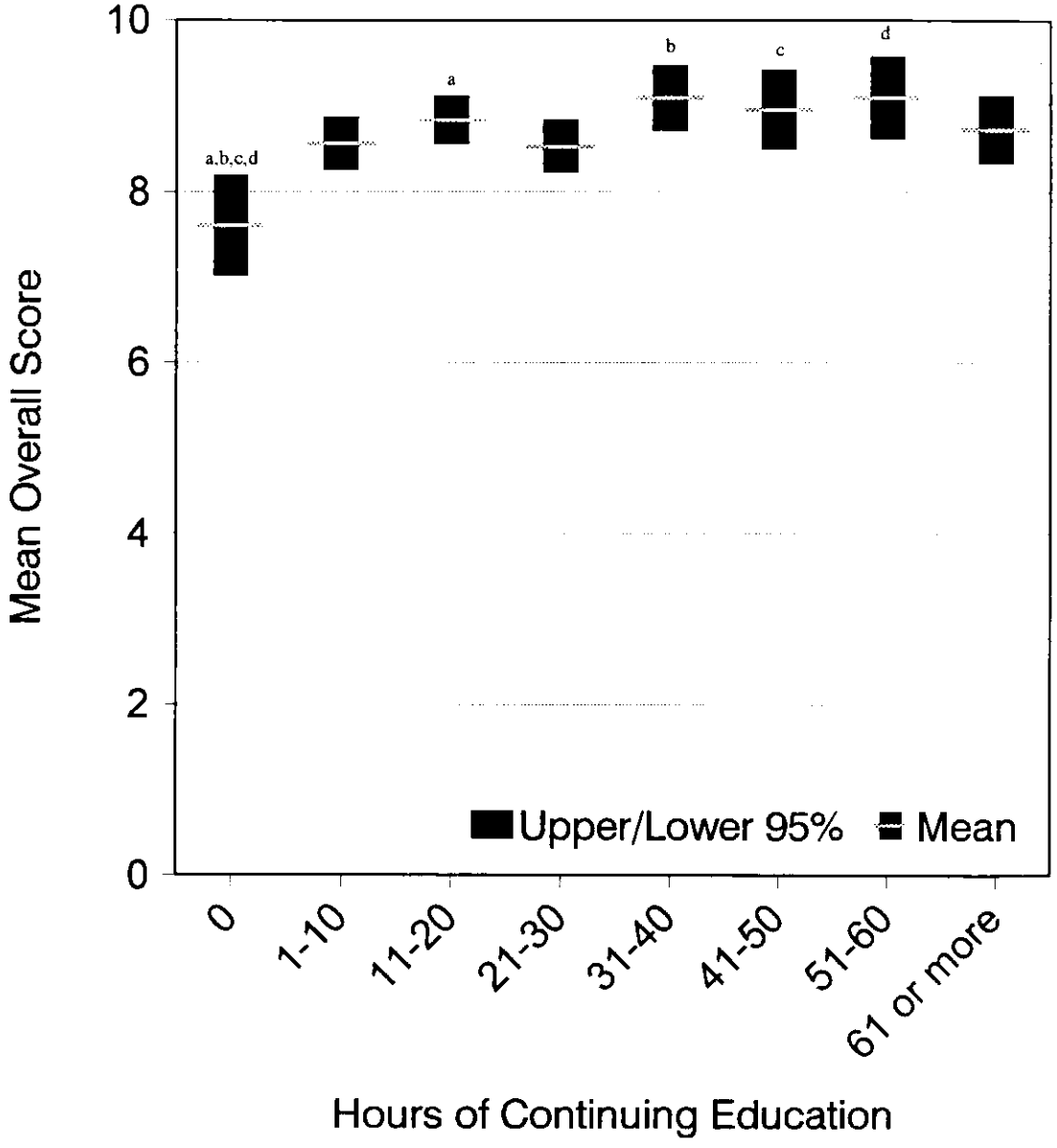

Figure 7. Mean overall score by hours of continuing education during the past year (a-d denote significantly different means, Scheffe's Test, $p>0.05$).

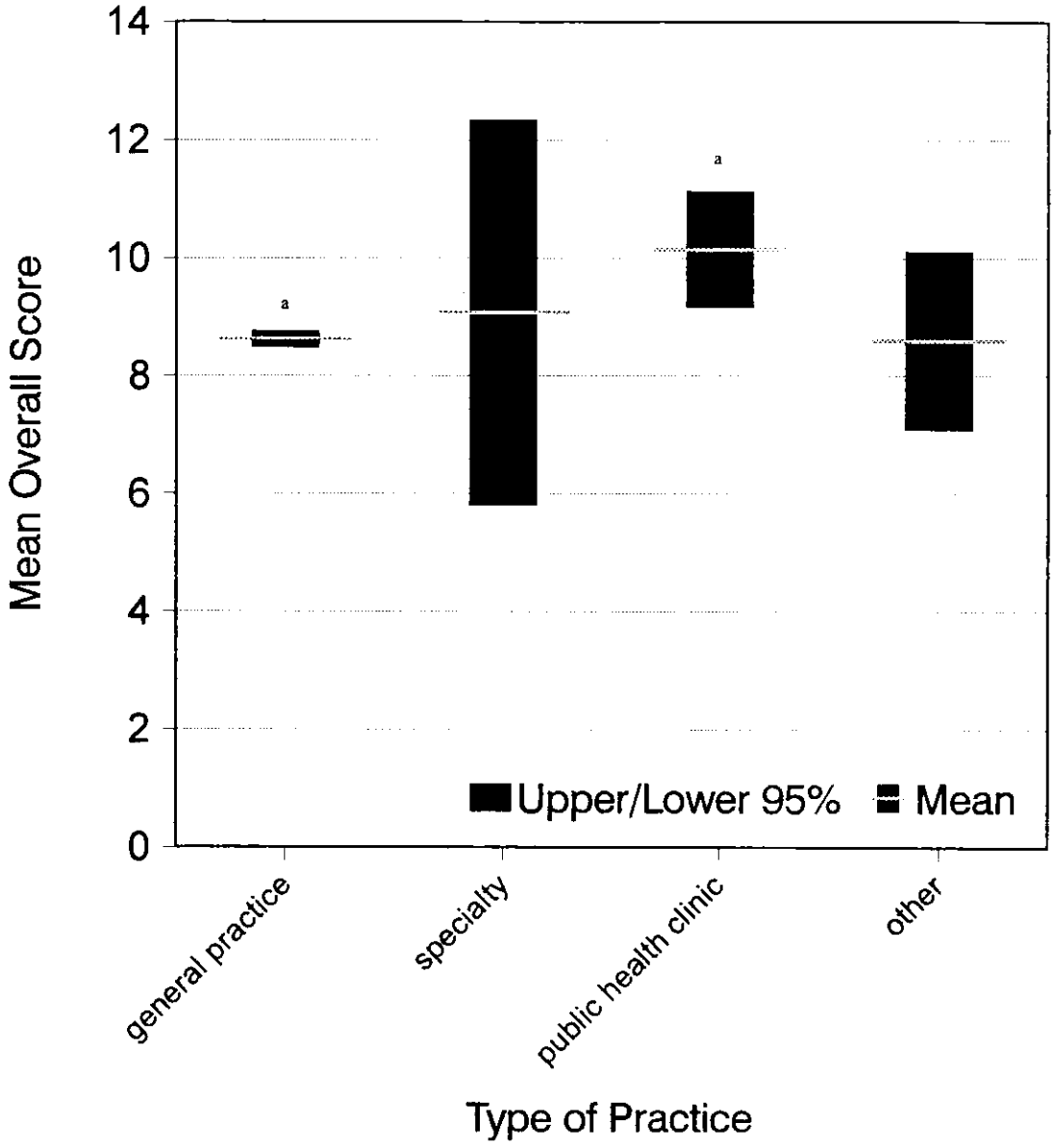

Figure 8. Mean overall score by type of dental practice
(a denotes significantly different means, Scheffe's Test, $p<0.05$).

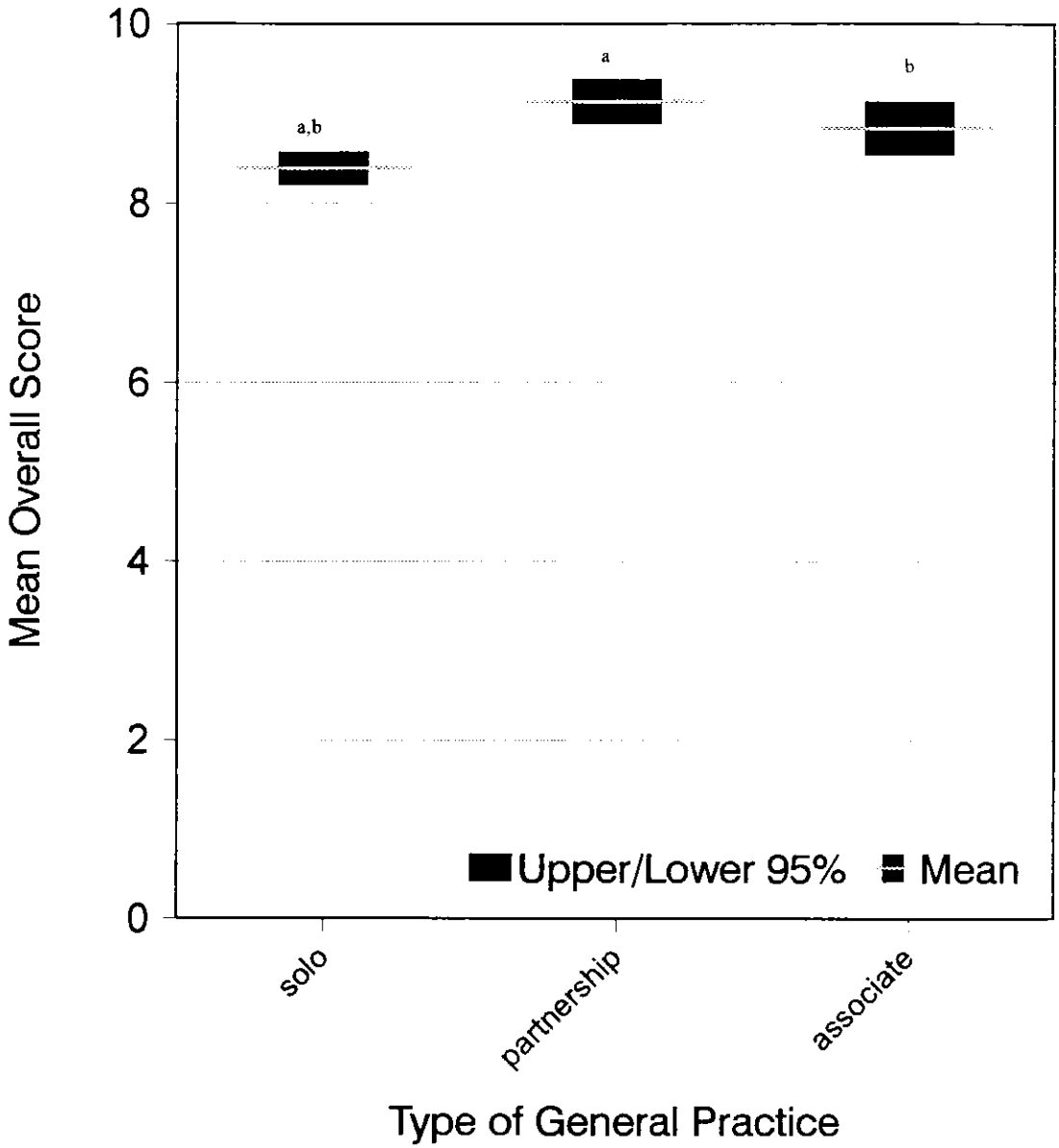

Figure 9. Mean overall score of general practitioners by type of general practice (a,b denote significantly different means, Scheffe's Test, $p<0.05$).

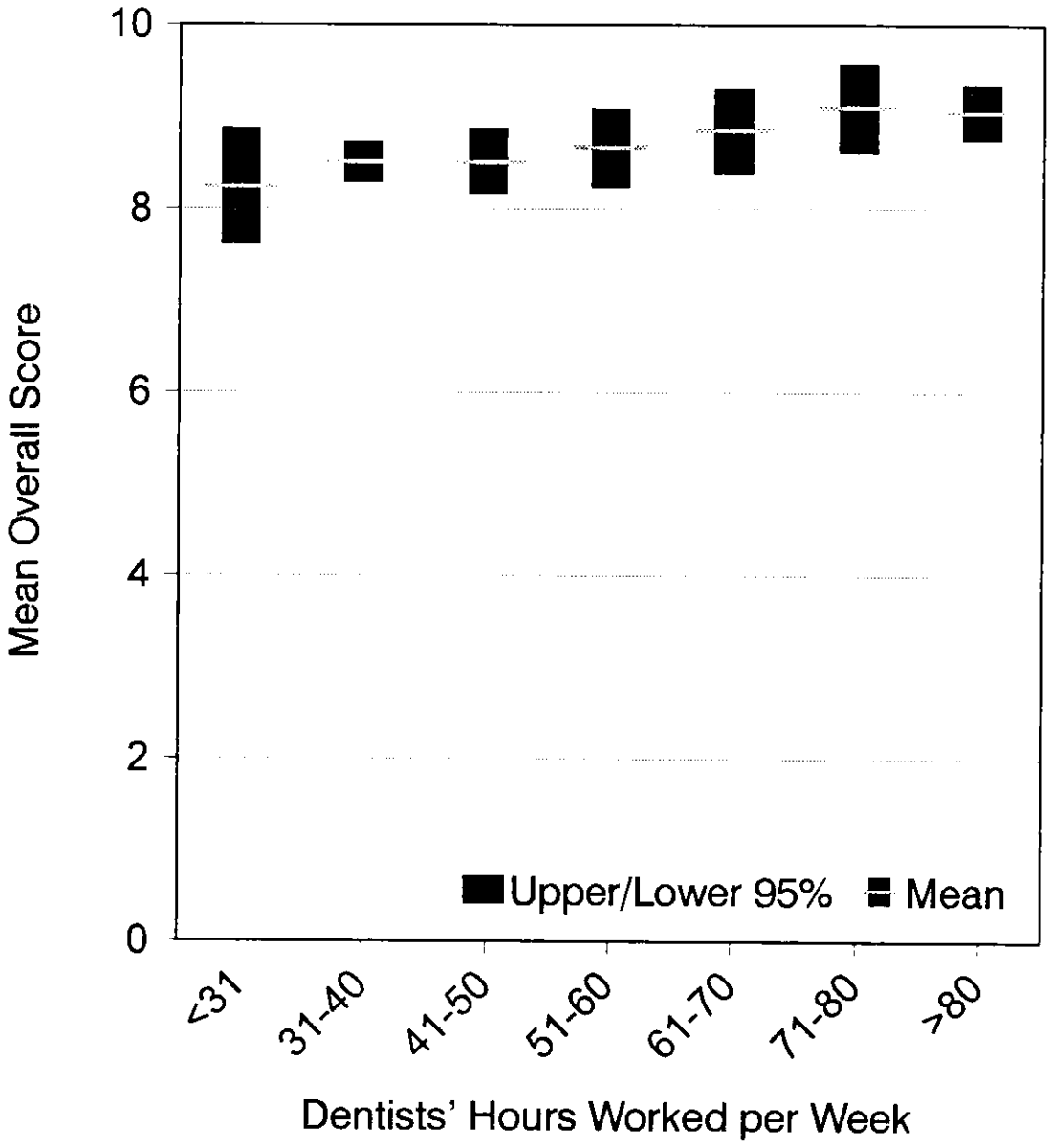

Figure 10. Mean overall score by the total number of hours worked per week by all dentists in the responding dentist's practice.

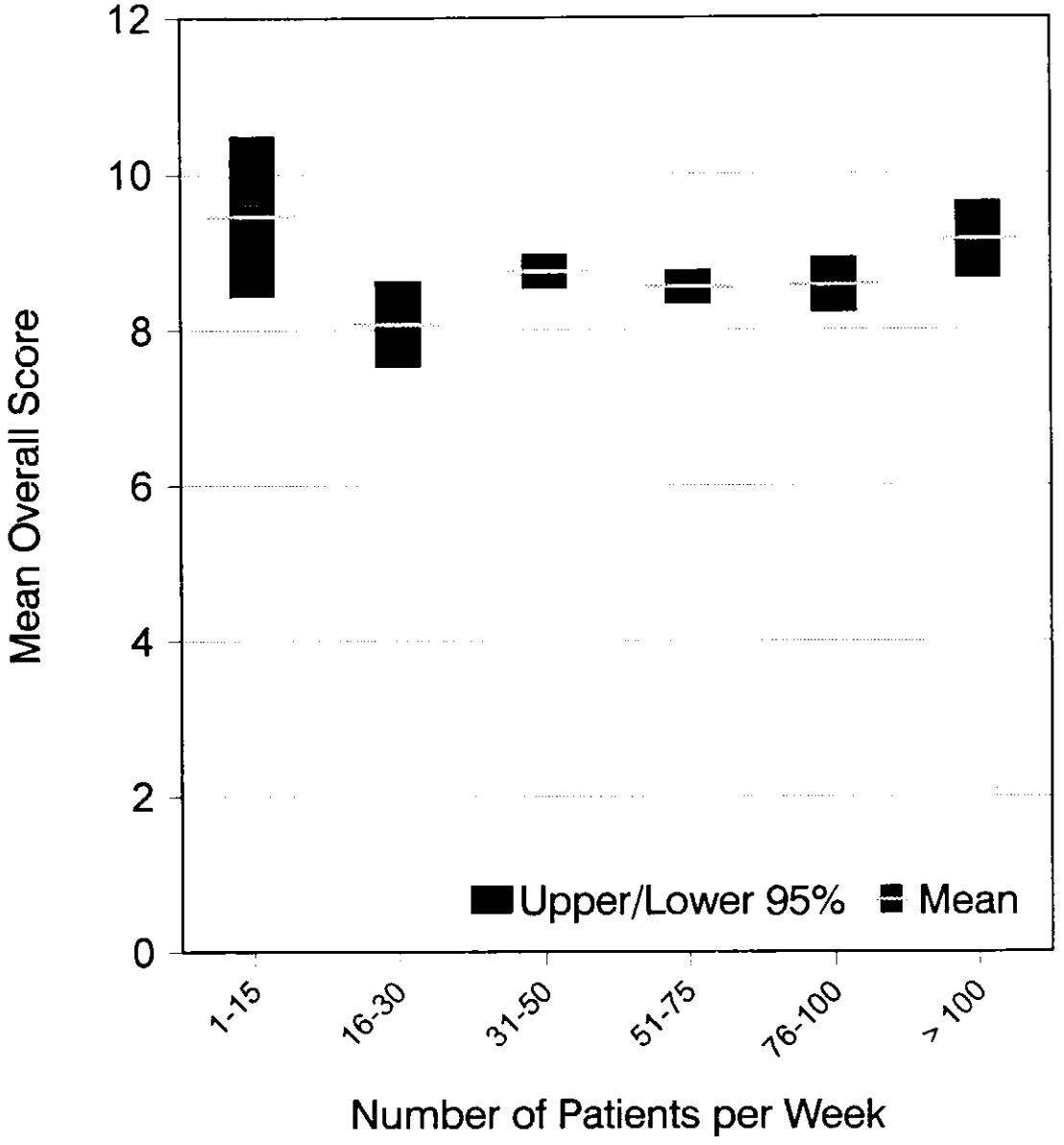

Figure 11. Mean overall score by number of patients per week
(no significant differences among the means were found, Scheffe's Test, $p \geq 0.05$)

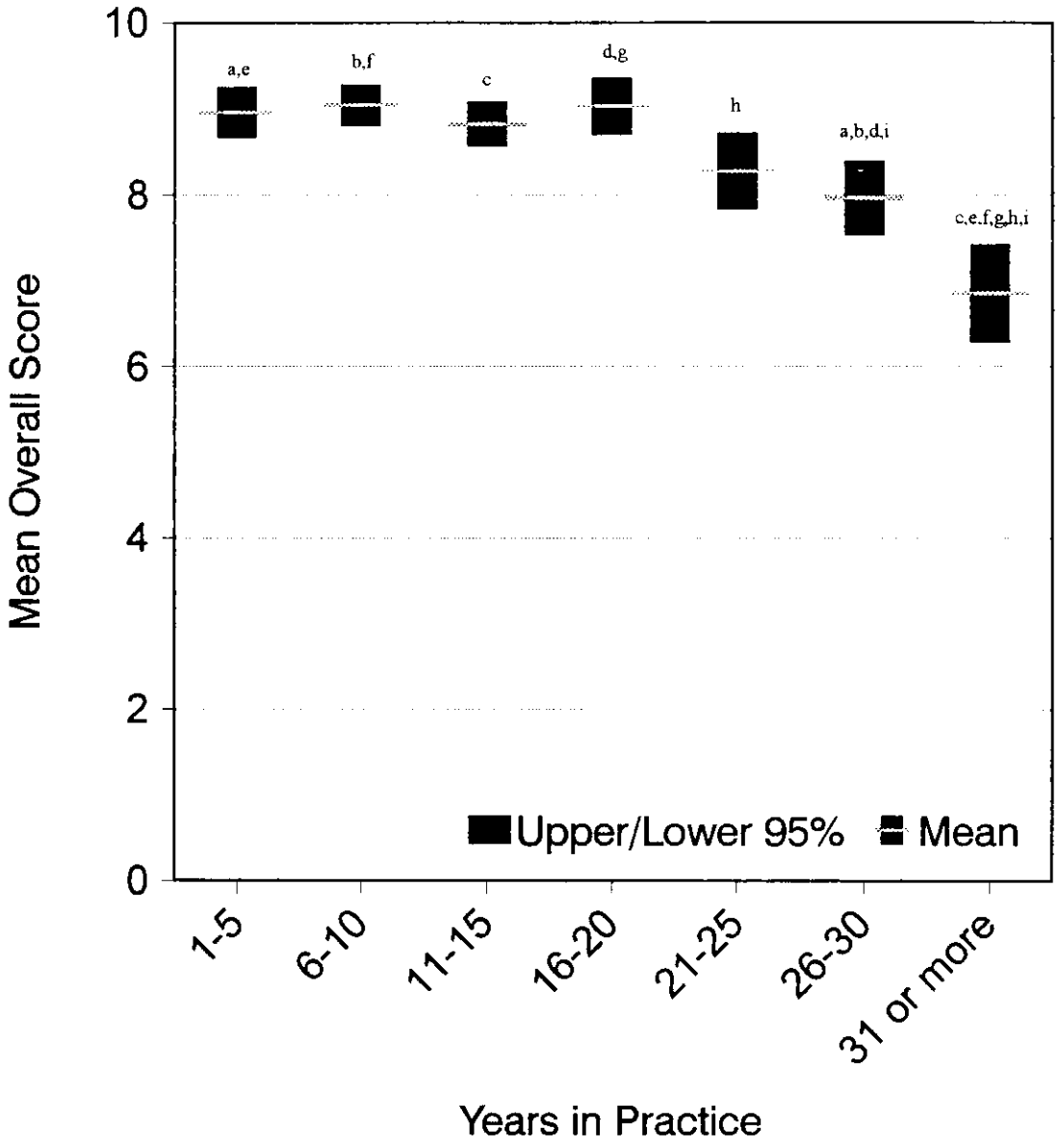

Figure 12. Mean overall score by the number of years practicing dentistry (a-i denote significantly different means, Scheffe's Test, $p<0.05$).

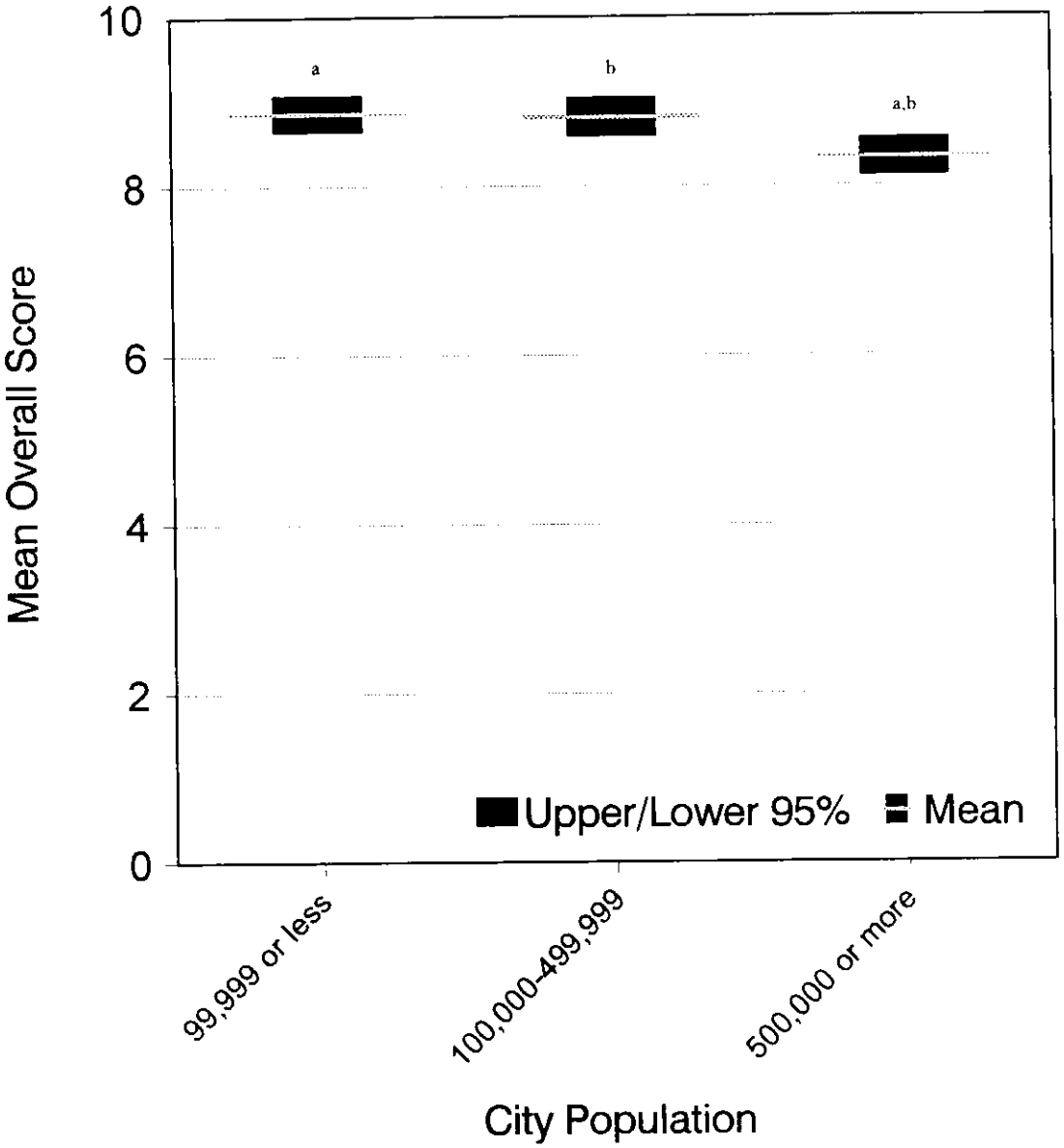

Figure 13. Mean overall score by population of dentist's city or town (a,b denote significant different means, Scheffe's Test, $p<0.05$).

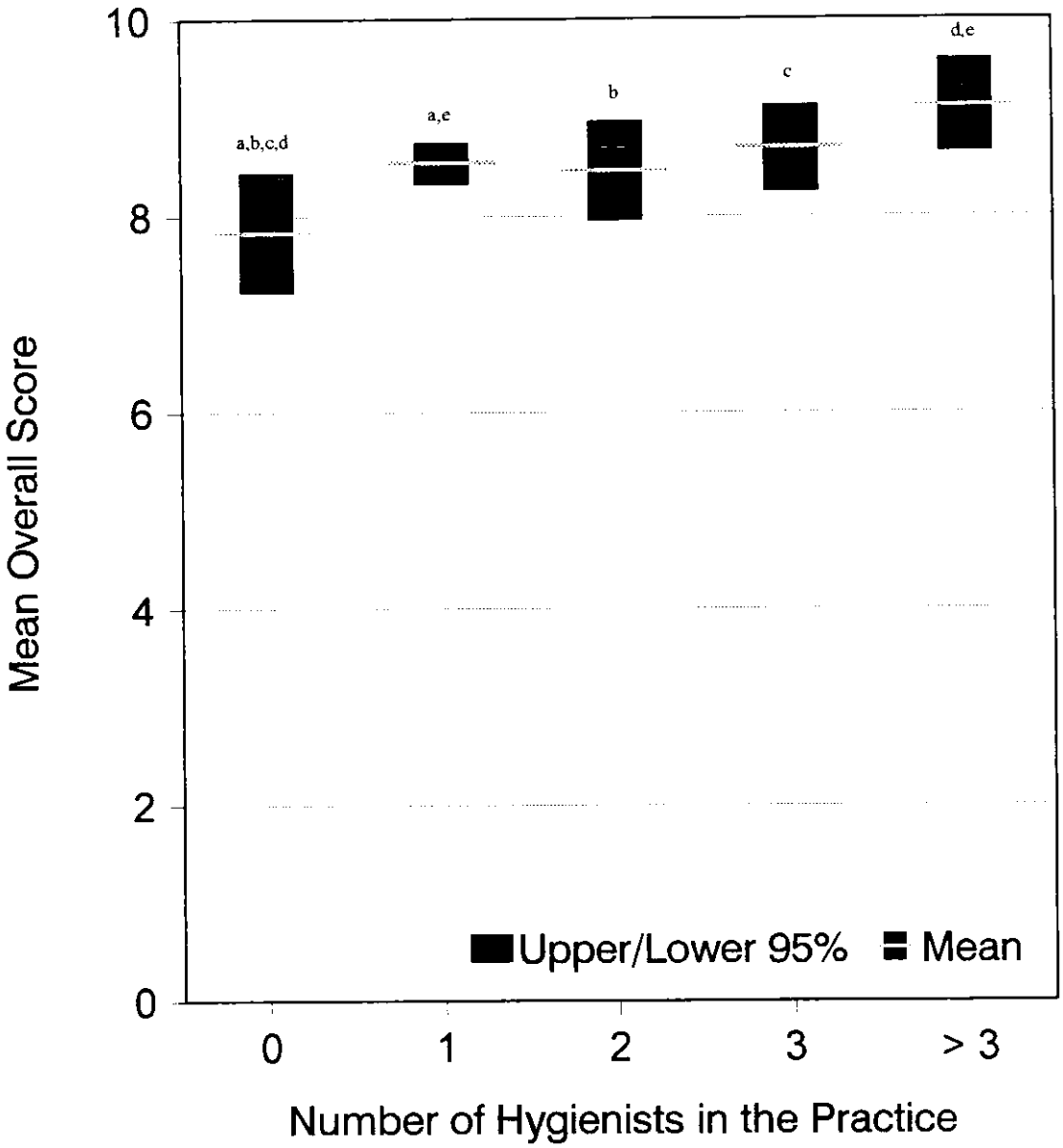

Figure 14. Mean overall score by the total number of hygienists working in the responding dentist's practice (a-e denote significantly different means, Scheffe's Test, $p>0.05$).

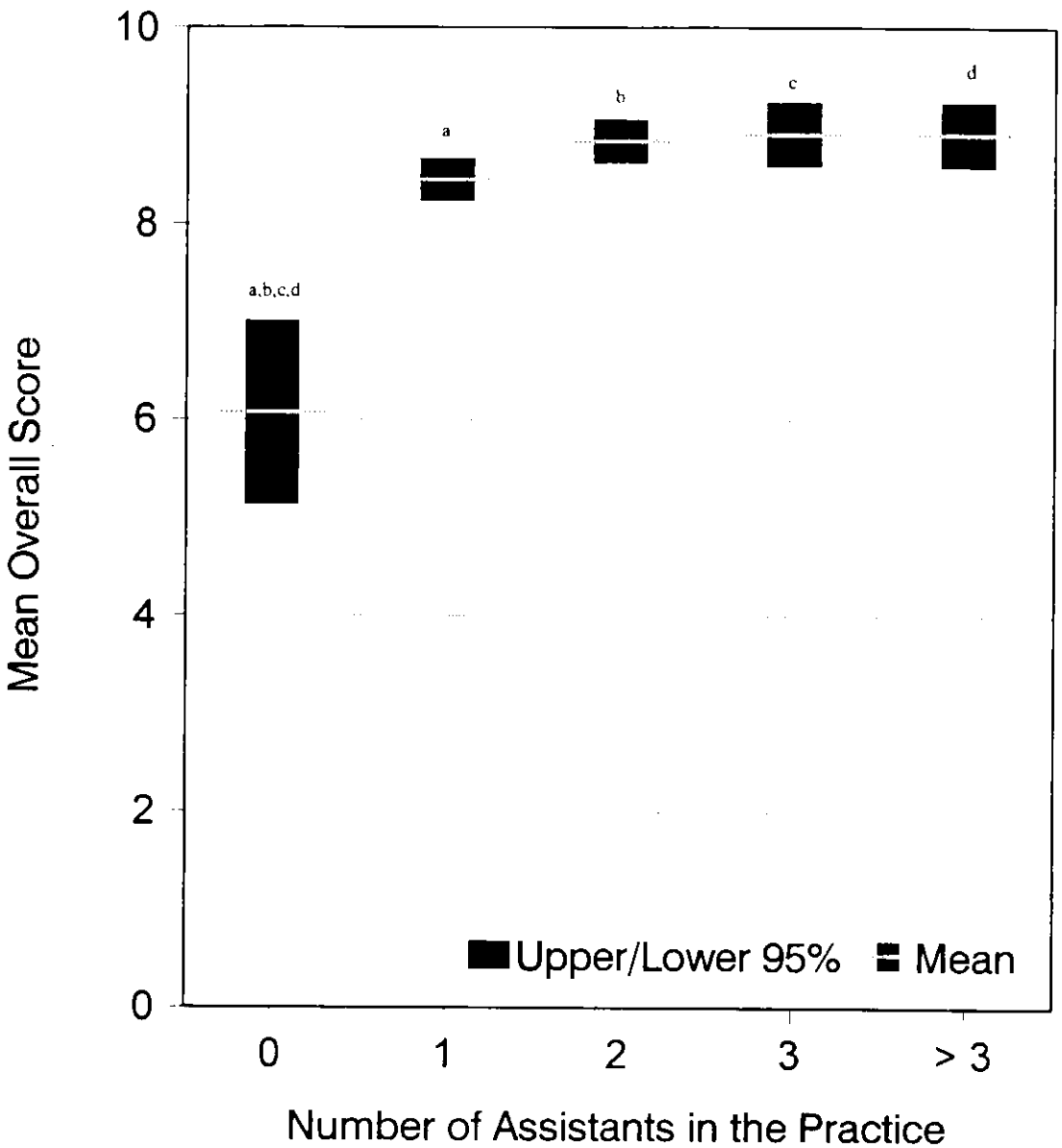

Figure 15. Mean overall score by the total number of dental assistants working in the responding dentist's practice (a-d denote significantly different means, Scheffe's Test, $p>0.05$).

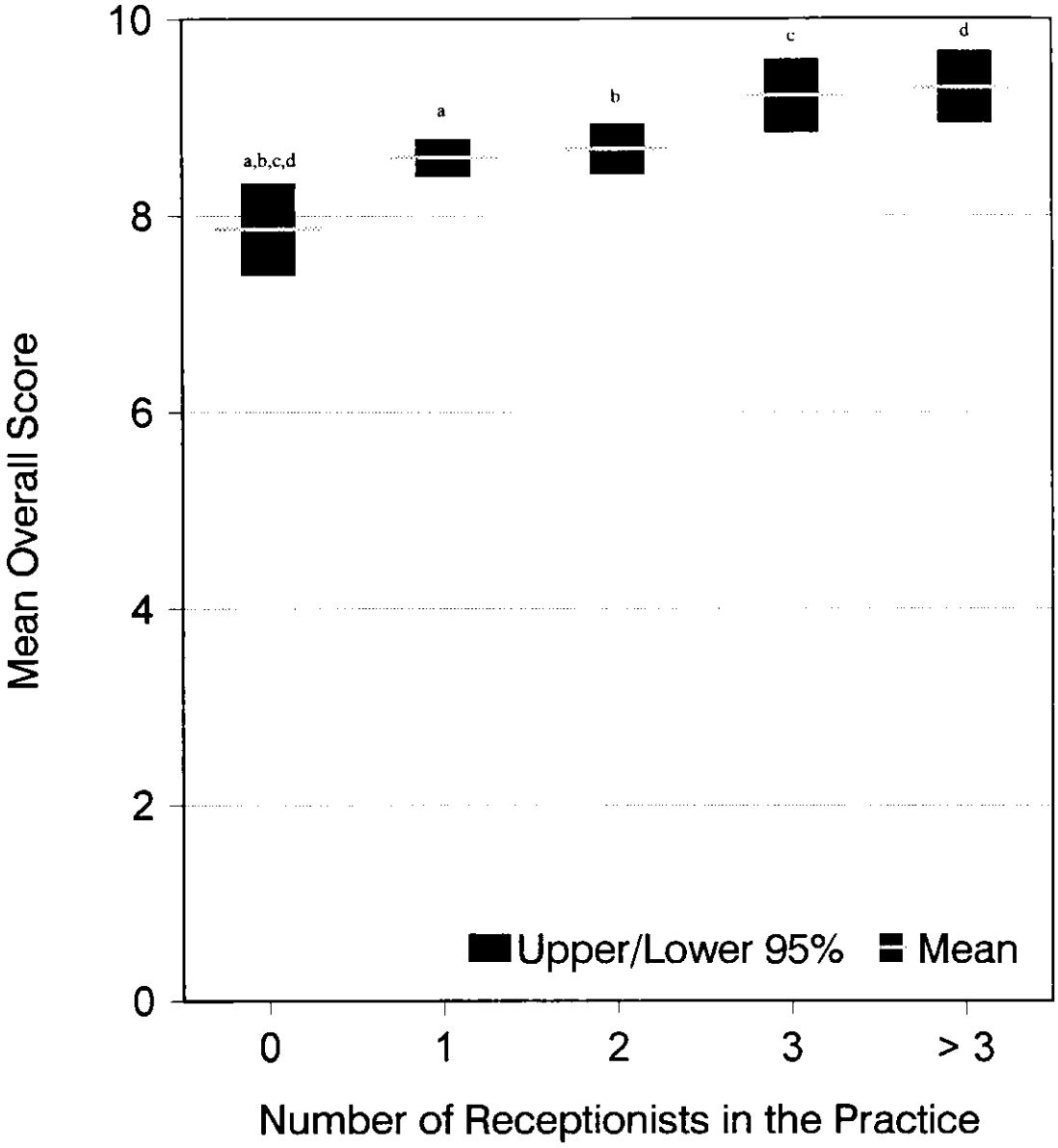

Figure 16. Mean overall score by the total number of secretaries/receptionists working in the responding dentist's practice (a-d denote significantly different means, Scheffe's Test, $p>0.05$).

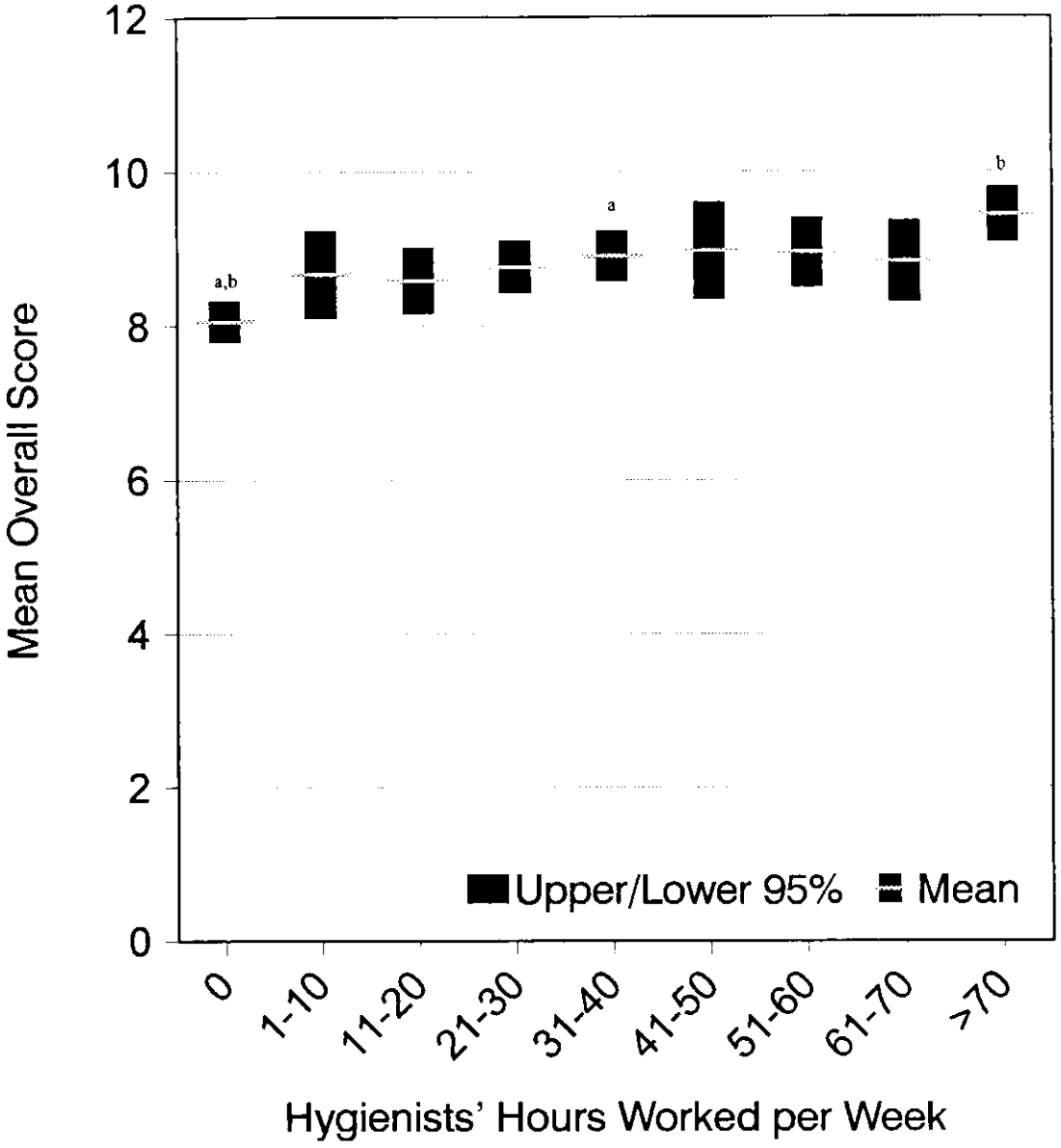

Figure 17. Mean overall score by the total number of hours worked by all hygienists in the responding dentist's practice (a, b denote significantly different means, Scheffe's Test, $p>0.05$).

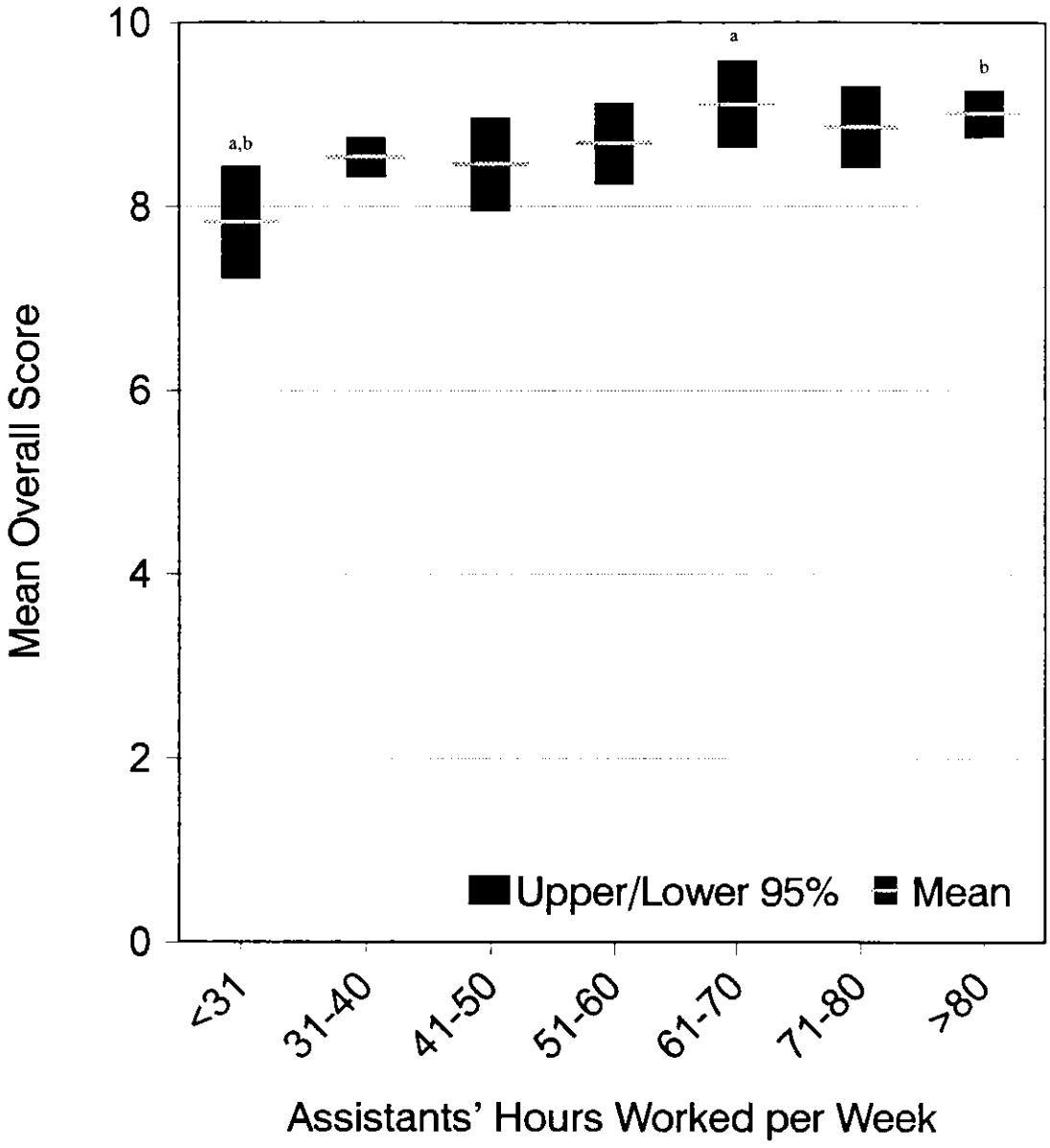

Figure 18. Mean overall score by the total number of hours worked by all dental assistants in the responding dentist's practice (a, b denote significantly different means, Scheffe's Test, $p>0.05$).

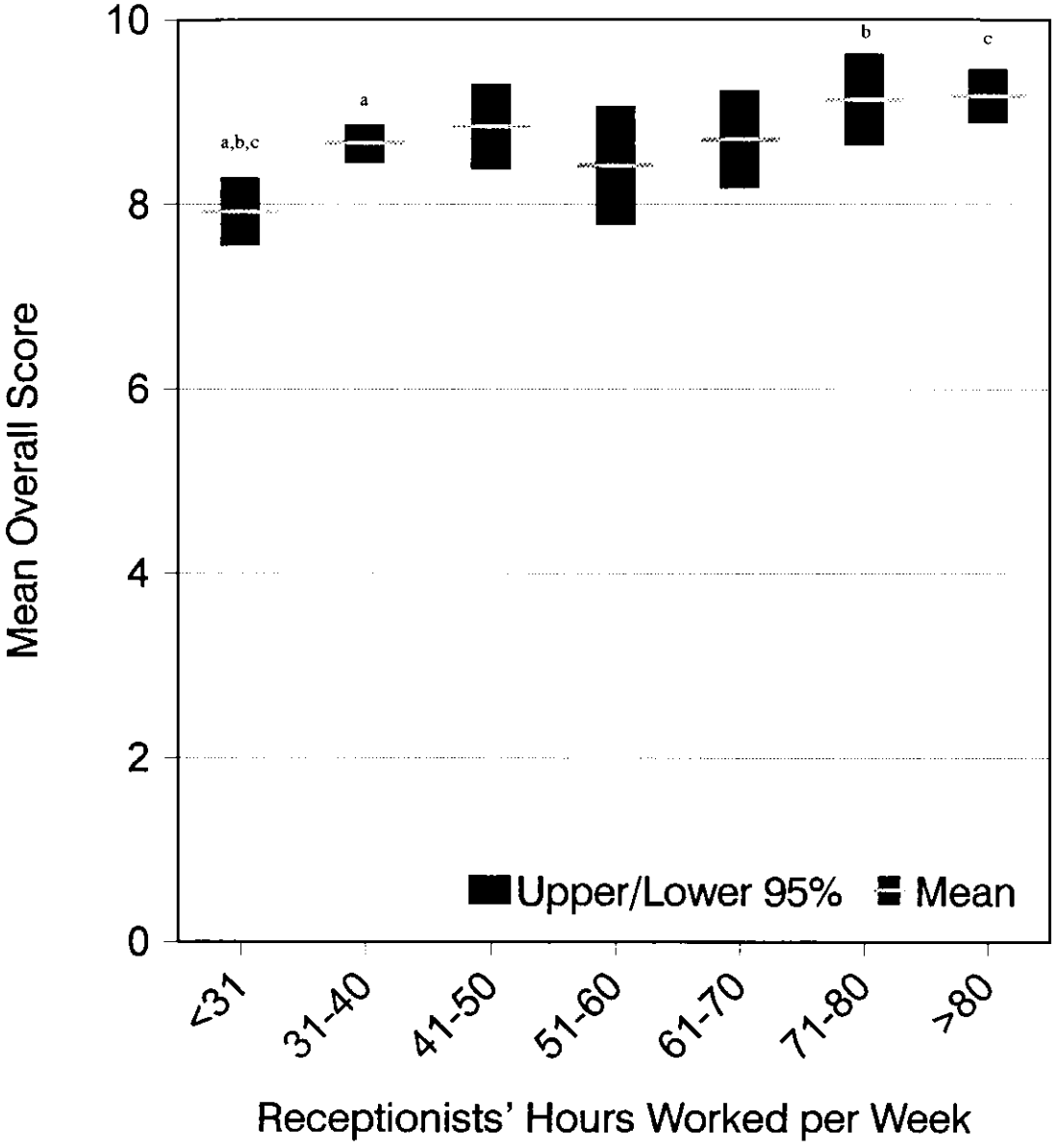

Figure 19. Mean overall score by the total number of hours worked by all secretaries/receptionists in the responding dentist's practice (a-c denote significantly different means, Scheffe's Test, $p>0.05$).

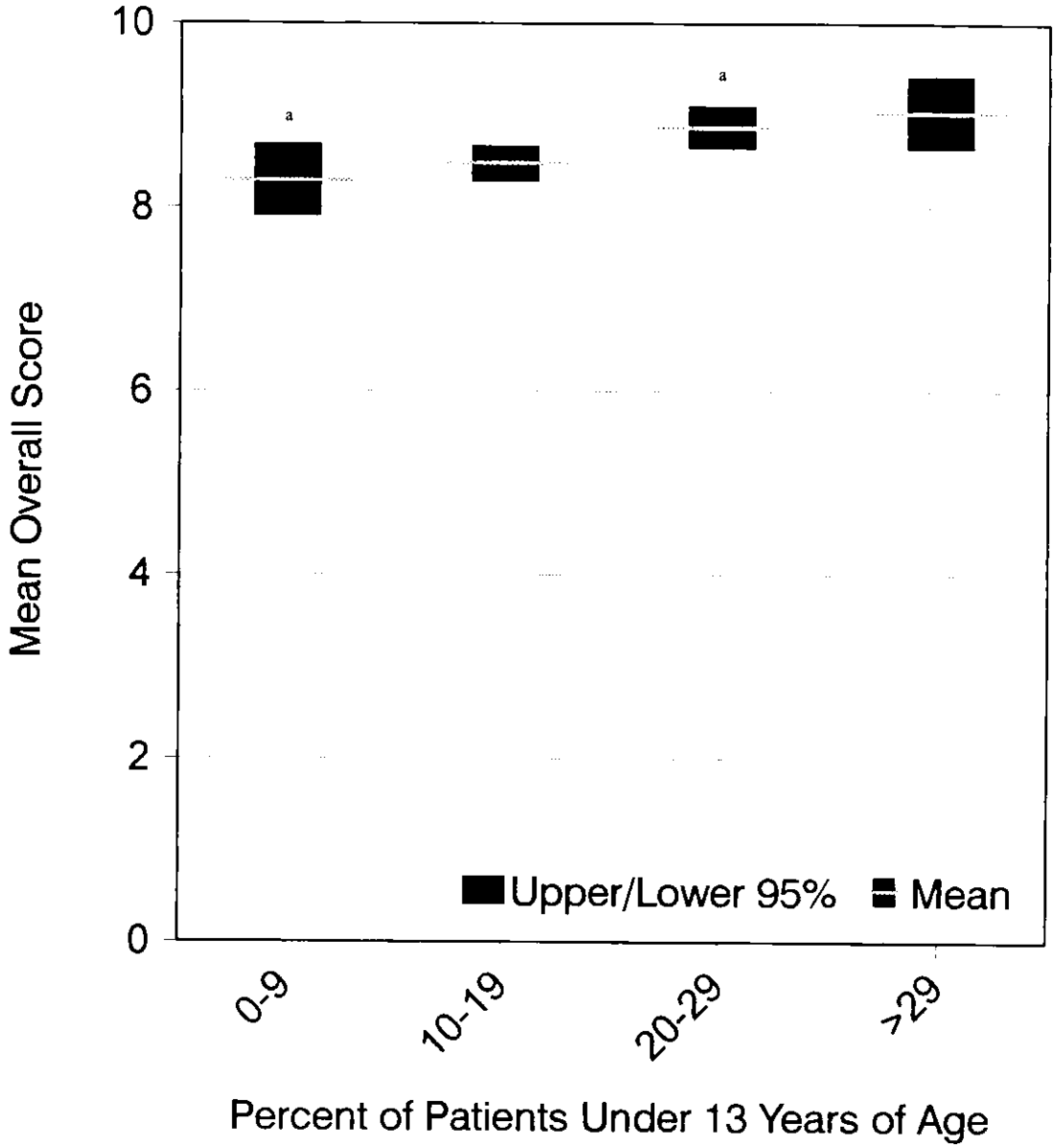

Figure 20. Mean overall score by the percentage of the responding dentist's patients who are under 13 years of age (a denotes significantly different means, Scheffe's Test, $p>0.05$)

References

American Dental Association, Council on Dental Materials, Instruments, and Equipment. 1989. Recommendations in radiographic practices: an update, 1988. *JADA* 118:115-117.

Bader, J.D., Shugars, D.A. 1995. Variation, treatment outcomes, and practice guidelines in dental practice. *J Dent Educ* 59(1):61-95.

Dean, A.G., Dean, J.A., Burton, A.H., Dicker, R.C. Epi Info, version 5: a word processing database, and statistics program for epidemiology on microcomputers. USD, Incorporated, Stone Mountain, Georgia, 1990.

El-Mowafy, O.M., Lewis, D.W. 1994. Restorative decision making by Ontario dentists. *J Can Dent Assoc* 60(4):305-316.

Holloway, P.J., Clarkson, J.E. 1994. Cost:benefit of prevention in practice. *Int Dent J* 44:317-322

Johnston, D.W., Lewis, D.W. 1995. Three-year randomized trial of professionally applied topical fluoride gel comparing annual and biannual applications with/without prior prophylaxis. *Caries Res* 29:331-336.

Leake, J.L, Main, P.A. 1995. Preliminary findings from the 1994 Ontario Children's Dental Health Survey. *Can J Comm Dent* 10(2):38-43.

Main, P.A. 1993. Review of current infection control procedures. Community Dental Health Services Research Unit, Quality Assurance, Report No. 5.

Norusis, M.J. SPSS/PC+ 4.0 Base Manual for IBM PC/XT/AT and PS/2. SPSS Inc. Chicago, Ill. 1990.

O'Keefe, J.P. 1995. A template dental health status report for Ontario public health units. *Can J Comm Dent* 10(1):18-24.

Stephens, R.G., Kogon, S.L. 1990. New U.S. guidelines for prescribing dental radiographs - a critical review. *J Can Dent Assoc* 56:1019-1024.

Swan, E.S.C., Lewis, D.W. 1993a. Ontario dentists: 2. Bitewing utilization and restorative treatment decisions. *J Can Dent Assoc* 59:68-75.

Swan, E.S.C., Lewis, D.W. 1993b. Ontario dentists: 3. Radiographs prescribed in general practice. *J Can Dent Assoc* 59:76-79.

Woodward, G.L., Leake, J.L. 1993. The use of space maintainers in the North York Public Dental Program. Community Dental Health Services Research Unit, Quality Assurance, Report No. 4.

Woodward, G.L., Leake, J.L. 1995. When to place an initial restoration. Community Dental Health Services Research Unit, Quality Assurance, Report No. 9.

Woodward, G.L., Lewis, D.W. 1993. The use of pit and fissure sealants in the North York Public Dental Program. Community Dental Health Services Research Unit, Quality Assurance, Report No. 1.

Woodward, G.L., Lewis, D.W. 1995. The use of professionally applied topical fluorides in the North York Public Dental Program. Community Dental Health Services Research Unit, Quality Assurance, Report No. 8.

Woodward, G.L., Main, P.A. 1993. The use of dental radiographs in the North York Public Dental Program. Community Dental Health Services Research Unit, Quality Assurance, Report No. 3.

Woodward, G.L., Main, P.A., Leake, J.L. 1995. Oral health status of third grade children in North York. Clinical and parent-reported measures. Community Dental Health Services Research Unit, Quality Assurance, Report No. 11.

Woodward, G.L., and Ryding, W. 1993. The use of amalgam, composite resin, and glass ionomer for posterior restorations, and the criteria for replacing posterior restorations in the North York Public Dental Program. Community Dental Health Services Research Unit, Quality Assurance, Report No. 2.

APPENDIX 1

UNIVERSITY OF TORONTO

FACULTY OF DENTISTRY

ONTARIO DENTAL SURVEY

For each of the following questions please circle the appropriate number corresponding to your response. In some instances, you will be required to write in your answer. Please do so in the spaces provided.

GENERAL KNOWLEDGE AND PRACTICES SECTION

1. **Based on clinical experience in your community, on average, how long does it take approximal caries in posterior teeth to progress from the outer enamel surface to the dentinoenamel junction (DEJ) in the:**

		LESS THAN 6 MONTHS	6 TO 11 MONTHS	12 TO 23 MONTHS	MORE THAN 23 MONTHS
A)	PRIMARY DENTITION	1	2	3	4
B)	PERMANENT DENTITION	1	2	3	4

2. **Based on clinical experience in your community, on average, how long does it take occlusal caries in posterior teeth to progress from the outer enamel surface to the dentinoenamel junction (DEJ) in the:**

		LESS THAN 6 MONTHS	6 TO 11 MONTHS	12 TO 23 MONTHS	MORE THAN 23 MONTHS
A)	PRIMARY DENTITION	1	2	3	4
B)	PERMANENT DENTITION	1	2	3	4

3. **On average, how long would you expect a typical MO amalgam, placed by yourself, to last in an adult patient?**

NO. OF YEARS ( )

4. **How long would you expect the same MO amalgam to last when initially placed in a 12 year old child?**

NO. OF YEARS ( )

5. **On average, please indicate the optimal time interval between dental examinations for patients in each of the following age groups:**

PATIENT AGE GROUP	INTERVAL IN MONTHS				OTHER, SPECIFY IN MONTHS	NO SPECIFIC TIME INTERVAL	NOT APPLICABLE
A) 3 – 5 YEARS:	4	6	12	18	( )	☐	☐
B) 6 – 12 YEARS:	4	6	12	18	( )	☐	☐
C) 13 – 18 YEARS:	4	6	12	18	( )	☐	☐
D) 19 – 30 YEARS:	4	6	12	18	( )	☐	☐
E) 31 – 44 YEARS:	4	6	12	18	( )	☐	☐
F) 45 – 64 YEARS:	4	6	12	18	( )	☐	☐
G) 65 YEARS AND OVER	4	6	12	18	( )	☐	☐

6. **On average, please indicate the optimal time interval between performing a prophylaxis for patients in each of the following age groups:**

PATIENT AGE GROUP	INTERVAL IN MONTHS				OTHER, SPECIFY IN MONTHS	NO SPECIFIC TIME INTERVAL	NOT APPLICABLE
A) 3 – 5 YEARS:	4	6	12	18	( )	☐	☐
B) 6 – 12 YEARS:	4	6	12	18	( )	☐	☐
C) 13 – 18 YEARS	4	6	12	18	( )	☐	☐
D) 19 – 30 YEARS	4	6	12	18	( )	☐	☐
E) 31 – 44 YEARS	4	6	12	18	( )	☐	☐
F) 45 – 64 YEARS	4	6	12	18	( )	☐	☐
G) 65 YEARS AND OVER	4	6	12	18	( )	☐	☐

7. On average, please indicate the optimal time interval between topical fluoride treatments for patients in each of the following age groups:

PATIENT AGE GROUP	INTERVAL IN MONTHS				OTHER, SPECIFY IN MONTHS	NO SPECIFIC TIME INTERVAL	NOT APPLICABLE
A) 3 – 5 YEARS:	4	6	12	18	( )	☐	☐
B) 6 – 12 YEARS:	4	6	12	18	( )	☐	☐
C) 13 – 18 YEARS:	4	6	12	18	( )	☐	☐
D) 19 – 30 YEARS:	4	6	12	18	( )	☐	☐

8. Do you use any sealants in your practice?

1 NO

2 YES ...IF YES, APPROXIMATELY WHAT PERCENTAGE OF YOUR PATIENTS IN EACH OF THE FOLLOWING AGE GROUPS RECEIVE SEALANTS?

A) UNDER 6 YEARS ( )%

B) 6 TO 11 YEARS ( )%

C) 12 TO 16 YEARS ( )%

D) 17 TO 19 YEARS ( )%

E) 20 YEARS OR MORE ( )%

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE	DON'T KNOW
9. The effectiveness of sealants in preventing caries is scientifically conclusive.	1	2	3	4	5
10. Applying sealants over small fissure lesions in teeth will lead to further decay.	1	2	3	4	5
11. Sealants are cost-effective for patients when applied early to:					
A) PRIMARY MOLARS	1	2	3	4	5
B) PERMANENT PREMOLARS	1	2	3	4	5
C) PERMANENT MOLARS	1	2	3	4	5
12. Following a topical fluoride application, all tooth surfaces are equally well protected.	1	2	3	4	5
13. Early incipient enamel caries can be cured.	1	2	3	4	5
14. To achieve maximum caries prevention for the average patient, it is essential to perform a prophylaxis prior to topical fluoride application.	1	2	3	4	5
15. Diet counselling by dental personnel is an effective method for preventing caries.	1	2	3	4	5
16. It is worse to fail to detect enamel caries than it is to unnecessarily restore a sound tooth.	1	2	3	4	5

	ALWAYS	USUALLY	SOMETIMES	RARELY /NEVER	
17. As part of the routine examination for your patients, do you regularly perform periodontal examinations using a periodontal probe?	1	2	3	4	
18. Do you regularly record the periodontal condition on the patient chart?	1	2	3	4	
19. How often do you use a rubber dam when performing each of the following procedures?					
A) ENDODONTIC PROCEDURES	1	2	3	4	
B) AMALGAM RESTORATIONS	1	2	3	4	
C) COMPOSITE RESIN RESTORATIONS	1	2	3	4	
D) BLEACHING	1	2	3	4	N/A
20. Do you use leaded protection for your patients when taking radiographs?	1	2	3	4	
21. Do you use the following barrier techniques when treating patients?					
A) RUBBER GLOVES	1	2	3	4	
B) PROTECTIVE EYEWEAR	1	2	3	4	
C) FACEMASK	1	2	3	4	

RADIOGRAPHIC SECTION

22. **Would you like to see explicit guidelines for radiologic examinations developed by the profession?**

1 YES, STRONGLY AGREE
2 YES, AGREE
3 NO, DISAGREE
4 NO, STRONGLY DISAGREE

23. **Do you routinely take radiographs as part of the initial examination of a new patient?**

1 NO
2 YES, ALWAYS

Yes, unless the patient provides previously taken radiographs which are no older than:

3 3 MONTHS
4 6 MONTHS
5 9 MONTHS
6 12 MONTHS
7 18 MONTHS
8 24 MONTHS
9 36 MONTHS
10 48 MONTHS
11 OTHER, PLEASE SPECIFY IN MONTHS ( )

24. **The criteria you use to select patients for radiologic examination is primarily based on (select as many as apply):**

A) WHAT YOU WERE TAUGHT AT DENTAL SCHOOL
B) YOUR CLINICAL EXPERIENCE
C) YOUR OFFICE POLICY AND PROCEDURE MANUAL AND/OR PROTOCOL
D) TEXTBOOK, PLEASE SPECIFY _____
E) PROFESSIONAL JOURNALS, PLEASE SPECIFY _____
F) PUBLISHED GUIDELINES, PLEASE SPECIFY _____
G) OTHER, PLEASE SPECIFY _____

25. **Please consider the situation of regular patients in your practice who have been receiving dental care from you for several years. Suppose such patients exhibit no clinical caries on recall, have not had a cavity in 2-3 years, and show no other signs or symptoms of significance.**

Please indicate the interval you would recommend for recall bitewings to be taken for each patient type by circling the appropriate number of months below, or, specify in months another interval, or, indicate no specific interval in the spaces provided:

	PATIENT TYPE	INTERVAL MONTHS						OTHER	NO SPECIFIC INTERVAL
A)	CHILD-PRIMARY DENTITION	6	12	18	24	30	36	( )	☐
B)	CHILD-TRANSITIONAL DENTITION	6	12	18	24	30	36	( )	☐
C)	ADOLESCENT-PERMANENT DENTITION	6	12	18	24	30	36	( )	☐
D)	ADULT WITH ALL OR MOST TEETH	6	12	18	24	30	36	( )	☐

26. **Let's suppose that a few regular patients in your practice exhibit clinical caries on recall. These patients have poor oral hygiene and are known to snack on cariogenic foods.**

Please indicate the interval you would recommend for recall bitewings to be taken for each patient type by circling the appropriate number of months below, or, specify in months another interval, or, indicate no specific interval in the spaces provided:

	PATIENT TYPE	INTERVAL MONTHS						OTHER	NO SPECIFIC INTERVAL
A)	CHILD-PRIMARY DENTITION	6	12	18	24	30	36	( )	☐
B)	CHILD-TRANSITIONAL DENTITION	6	12	18	24	30	36	( )	☐
C)	ADOLESCENT-PERMANENT DENTITION	6	12	18	24	30	36	( )	☐
D)	ADULT WITH ALL OR MOST TEETH	6	12	18	24	30	36	( )	☐

RESTORATIVE SECTION

In questions 27 to 29, we would like to determine what criteria Ontario dentists currently think is the most appropriate minimum point (threshold) at which a restoration ought to be placed for a twelve year old, thirty year old and fifty-five year old patient of average susceptibility. Please assume that apart from the primary carious lesion described, there are no other reasons for concern about the tooth in question and that the patients are equally similar in all other respects.

27. The following scale describes approximal lesion severity in a posterior tooth, as assessed by bitewing radiographic appearance only. Please indicate the minimum point (threshold), which you consider to be the most appropriate for restoring the tooth for each patient, by circling only one number in each column.

APPROXIMAL LESION SEVERITY	A 12 YEAR OLD	B 30 YEAR OLD	C 55 YEAR OLD
A zone of generally increased radiolucency confined to the outer half of enamel.	1	1	1
A zone of generally increased radiolucency involving both inner and outer halves of the enamel up to but not beyond the DEJ.	2	2	2
A zone of generally increased radiolucency involving all enamel and extending just beyond the DEJ.	3	3	3
A zone of generally increased radiolucency involving the enamel and DEJ and extending to include the outer half of dentine.	4	4	4
A zone of generally increased radiolucency penetrating the inner half of dentine.	5	5	5

28. The following scale describes occlusal lesion severity in a posterior tooth as determined by visual and tactile assessment. Please indicate the minimum point (threshold), which you consider to be the most appropriate for restoring the tooth for each patient, by circling only one number in each column.

OCCLUSAL LESION SEVERITY	A 12 YEAR OLD	B 30 YEAR OLD	C 55 YEAR OLD
White opacities visible on the walls of a fissure	1	1	1
Narrow strip of dark staining at the base of a fissure.	2	2	2
Grey discoloration of the enamel around a stained fissure.	3	3	3
Cavity **less than 0.5mm** in diameter with **hard** floor.	4	4	4
Cavity **less than 0.5mm** in diameter with **softened** floor.	5	5	5
Cavity **between 0.5mm and 1.5mm** in diameter with **softened** floor.	6	6	6
Cavity **greater than 1.5mm** in diameter with **softened** floor.	7	7	7

29. The following scale describes buccal or lingual smooth-surface lesion severity in a posterior tooth as determined by visual and tactile assessment. Please indicate the minimum point (threshold), which you consider to be the most appropriate for restoring the tooth for each patient, by circling only one number in each column.

BUCCAL OR LINGUAL LESION SEVERITY	A 12 YEAR OLD	B 30 YEAR OLD	C 55 YEAR OLD
White or cream coloured area of increased opacity with no change in surface contour.	1	1	1
Dark brown area with surface intact.	2	2	2
Cavity **less than 0.5mm** in diameter with **hard** floor.	3	3	3
Cavity **less than 0.5mm** in diameter with **softened** floor.	4	4	4
Cavity **between 0.5mm and 1.5mm** diameter with **softened** floor.	5	5	5
Cavity **greater than 1.5mm** in diameter with **softened** floor.	6	6	6

Question 30 addresses factors which may affect your decision to place a restoration or not to place one immediately.

30. Please assume that you have detected a carious lesion that is almost at the point that you consider to be appropriate for restoration. For this lesion, please indicate how your decision - whether or not to restore immediately - would be influenced by each of the following conditions. Only select neutral when you feel a condition would not influence your decision either way

		RESTORE IMMEDIATELY	NOT RESTORE IMMEDIATELY	NEUTRAL
A)	Familiar patient who always returns within 6 months.	1	2	3
B)	Familiar patient who attends irregularly.	1	2	3
C)	New patient who appears to have been a regular attendee.	1	2	3
D)	New patient who does not appear to seek regular care.	1	2	3
E)	Twelve year old patient with no previous fillings.	1	2	3
F)	Thirty year old patient with no previous fillings.	1	2	3
G)	Fifty-five year old patient with no previous fillings.	1	2	3
H)	Twelve year old patient who appears to be caries susceptible.	1	2	3
I)	Thirty year old patient who appears to be caries susceptible.	1	2	3
J)	Fifty-five year old patient who appears to be caries susceptible	1	2	3
K)	Patient who lives in a fluoridated area	1	2	3
L)	Patient who lives in a nonfluoridated area.	1	2	3
M)	Patient with complete dental insurance coverage	1	2	3
N)	Patient with no dental insurance coverage.	1	2	3

Questions 31 and 32 address the restorative procedure which you would normally follow when a restoration is indicated.

31. **Please consider the case of an adult patient who in your judgement requires a restoration due to early approximal caries in one surface of posterior tooth. The adjacent teeth are intact and oral hygiene conditions are above average. Please indicate which one of the following procedures you would ideally implement:**

1 A conventional two-surface **amalgam** restoration involving the approximal surface and extending occlusally to include all the fissures
2 A slot **amalgam** restoration involving the proximal surface and extending occlusally just beyond the triangular fossa on the operating side, but not crossing to the other side of the occlusal surface.
3 A conventional two-surface **composite resin** restoration involving the proximal surface and extending occlusally to include all the fissures.
4 A slot **composite resin** restoration involving the proximal surface and extending occlusally just beyond the triangular fossa on the operating side, but not crossing to the other side of the occlusal surface

32. **Please consider the case of an adult patient who in your judgement requires a restoration in a posterior tooth due to a small occlusal cavity (1 – 1.5 mm in diameter) which has penetrated through the enamel and DEJ. The adjacent teeth are intact and oral hygiene conditions are above average. Please indicate which one of the following procedures you would ideally implement:**

1 Prepare a conventional occlusal cavity which extends to include all the fissures and retore with **amalgam.**
2 Prepare a small occlusal cavity just larger than the diameter of the decay and restore with **amalgam.**
3 Prepare a conventional occlusal cavity which extends to include all the fissures and restore with **composite resin.**
4 Prepare a small occlusal cavity just larger than the diameter of the decay and restore with **composite resin.**
5 Prepare a small occlusal cavity just larger than the diameter of the decay and restore with **composite resin** and **seal** the fissures with a fissure sealant.

33. **When examining a twelve year old patient, if you encountered an occlusal fissure which you thought might contain some caries, but which showed no cavitation and exhibited no radiolucency on a bitewing radiograph, would your first action be to:**

1 Place an amalgam
2 Place a preventive resin restoration
3 Place a sealant
4 Not intervene but keep tooth under review

34. **Which of the following methods do you routinely use for sterilization of burs used for restorative work?**

1 Cold sterilization by wiping the burs with disinfectant-soaked napkin.
2 Cold sterilization by immersing the burs in a disinfectant solution for a period of time recommended by the manufacturer.
3 Hot air oven.
4 Autoclave or chemiclave.
5 Other (describe)_____

35. **Which of the following methods do you routinely use for sterilization of slow and high-speed handpieces used for restorative work?**

1 Cold sterilization by wiping the handpiece with disinfectant-soaked napkin.
2 Cold sterilization by immersing the handpiece in a disinfectant solution for a period of time recommended by the manufacturer
3 Hot air oven.
4 Autoclave or chemiclave.
5 Other (describe)_____

36. **If you are routinely using an autoclave or chemiclave for sterilization of handpieces, how frequently do you sterilize them using this method?**

1 After each use
2 Twice a day, however, cold sterilization is used in between after each use
3 Once a day, however, cold sterilization is used in between after each use
4 Once a week, however, cold sterilization is used in between after each use
5 Not applicable

37. **How many sets of handpieces do you actively use in your primary place of practice?**

1 Once
2 Two
3 Three
4 More than three

DECISION MAKING SECTION

38. **We are interested in the reasons dentists start to use <u>new and different</u> radiologic, preventive and other clinical procedures and materials. Listed below are several factors which may serve to influence your use of new materials and procedures. Please circle the number on the five-point scale which best indicates how important <u>each of them</u> is to you at the present time.**

		VERY IMPORTANT				NOT AT ALL IMPORTANT
A)	Article in refereed professional journal	1	2	3	4	5
B)	Article in book	1	2	3	4	5
C)	Advertisement in literature	1	2	3	4	5
D)	Ease of application or use	1	2	3	4	5
E)	Cost	1	2	3	4	5
F)	Recommendation of colleague	1	2	3	4	5
G)	Published "Guidelines" or reviews	1	2	3	4	5
H)	Dental insurance coverage	1	2	3	4	5
I)	Manufacturer's recommendations	1	2	3	4	5
J)	Dental salespeople	1	2	3	4	5
K)	Specific requests of patients	1	2	3	4	5
L)	Postgraduate/continuing education courses	1	2	3	4	5
M)	Your own undergraduate training	1	2	3	4	5
N)	Mail advertising	1	2	3	4	5
O)	Promotional samples	1	2	3	4	5
P)	If there are **other** influences of major importance, please list them here. _____					

39. **Research indicates that dental practitioners are influenced to varying degrees by many factors besides the specific diagnosis and prognosis of disease when they make therapeutic decisions for patients. Please circle the number on the five-point scale which best indicates how important you feel each of the following factors are in influencing your treatment decisions.**

		VERY IMPORTANT				NOT AT ALL IMPORTANT
A)	Your own professional values and preferences.	1	2	3	4	5
B)	The patient's type and amount of past treatment.	1	2	3	4	5
C)	The presence or absence of dental insurance.	1	2	3	4	5
D)	With dental insurance coverage, the extent of the co-insurance part the patient must pay out of pocket.	1	2	3	4	5
E)	Your patient's expressed values and preferences.	1	2	3	4	5
F)	The patient's oral hygiene practices and oral cleanliness.	1	2	3	4	5
G)	The proven effectiveness by clinical studies of one procedure over another.	1	2	3	4	5
H)	Your clinical experience.	1	2	3	4	5
I)	The regularity of the patient's attendance pattern.	1	2	3	4	5
J)	The patient's convenience if the therapy requires frequent recalls and time.	1	2	3	4	5
K)	The patient's financial circumstances.	1	2	3	4	5
L)	Whether the patient is new or a regular patient.	1	2	3	4	5

40. **From the following list of materials, procedures and equipment, please indicate the extent that you have incorporated each item into your current practice:**

		HAVE USED AND CONTINUE TO USE WHEN NEED ARISES	HAVE USED BUT CONTINUE TO USE ONLY OCCASIONALLY	HAVE USED BUT RARELY/NEVER USE NOW	HAVE NEVER USED
A)	Light-cured composite resin	1	2	3	4
B))	Glass ionomer restoration	1	2	3	4
C)	Acid-etch (Maryland) bridge	1	2	3	
D)	Amalgam post	1	2	3	4
E)	Bleaching of vital teeth	1	2	3	4
F)	Electronic apex locator	1	2	3	4
G)	Electric pulp tester	1	2	3	4
H)	Fibreoptic handpiece	1	2	3	4
I)	Panoramic radiographs	1	2	3	4
J)	Precision attachments in partial denture work	1	2	3	4
K)	Osseointegrated implants for single tooth replacement or for fixed bridge work	1	2	3	4

DEMOGRAPHIC SECTION

41. Are you?

1 MALE
2 FEMALE

42. What year did you first graduate from dental school?

19_____

43. How many years have you been practicing dentistry?

NO. OF YEARS _____

44. Where did you receive your first degree in dentistry?

1 UNIVERSITY OF TORONTO
2 UNIVERSITY OF WESTERN ONTARIO
3 OTHER CANADIAN UNIVERSITY, PLEASE SPECIFY _____
4 NON CANADIAN UNIVERSITY, PLEASE SPECIFY _____

45. Have you in the <u>past twelve months</u> attended any lectures, continuing education courses, conferences, workshops, or study clubs related to dentistry?

1 NO
2 YES ...IF YES, PLEASE ESTIMATE NUMBER OF HOURS ( )

46. Approximately how many <u>hours per week</u> do you usually spend reading professional journals, newsletters, books and papers?

1 LESS THAN 1 HOUR
2 1 TO 2 HOURS
3 3 TO 4 HOURS
4 5 TO 6 HOURS
5 7 TO 8 HOURS
6 MORE THAN 8 HOURS

47. What is the population of the town/city in which your primary practice is located?

1 LESS THAN 4,999
2 5,000 TO 9,999
3 10,000 TO 24,999
4 25,000 TO 49,999
5 50,000 TO 99,999
6 100,000 TO 249,999
7 250,000 TO 499,999
8 500,000 AND GREATER (METROPOLITAN AREA)

48. Please circle the answer that best describes your primary practice.

<u>GENERAL</u> PRACTICE: 1 SOLO
2 PARTNERSHIP
3 ASSOCIATE

LIMITED TO <u>SPECIALTY</u> EMPHASIS: 4 SOLO
_____ 5 PARTNERSHIP
(PLEASE SPECIFY SPECIALTY)
6 ASSOCIATE

7 PUBLIC HEALTH CLINICAL PRACTICE

8 OTHER, PLEASE SPECIFY _____

49. Please indicate how many of each of the following types of personnel are employed in your primary place of practice and the total hours worked per week by all persons in each position:

		NUMBER	TOTAL HOURS
A)	Dentists (including yourself)	( )	( )
B)	Dental Hygienists	( )	( )
C)	Dental Assistants	( )	( )
D)	Dental Technicians	( )	( )
E)	Secretary/Receptionists	( )	( )
F)	Other, Please describe	( )	( )

_____

50. On average, what is the approximate number of patients you personally treat in a typical week?

1	1 to 15	4	51 to 75
2	16 to 30	5	76 to 100
3	31 to 50	6	Over 100

51. Would you describe your current practice as:

1 Less busy than you would like
2 As busy as you would like
3 Busier than you would like

52. How many hours per week do you usually spend practicing dentistry?

1	1 to 7 hours	6	36 to 42 hours
2	8 to 14 hours	7	43 to 49 hours
3	15 to 21 hours	8	50 to 56 hours
4	22 to 28 hours	9	More than 56 hours
5	29 to 35 hours		

53. Approximately what percentage* of the patients in your practice are in each of the following age groups?

A)	12 years and under	( )%
B)	13 to 20 years	( )%
C)	21 to 44 years	( )%
D)	45 to 64 years	( )%
E))	65 years and over	( )%

Please check that the total percentage equals 100%

54. Please estimate the percentage* of your patients who are:

A)	Covered by a private insurance plan that fully or partially pays for their dental care.	( )%
B)	Covered by a public plan that fully or partially pays for their dental expenses.	( )%
C)	Not covered by any third party and pay all of their own dental expenses.	( )%

Please check that the total percentage equals 100%

THANK YOU FOR YOUR TIME AND CO-OPERATION. PLEASE RETURN THIS QUESTIONNAIRE IN THE SELF-ADDRESSED POSTAGE-PAID ENVELOPE PROVIDED.