How Family Physicians Choose An Office Computer System

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Abstract: ***Background:*** **Purchasing an office computer can be time consuming and frustrating. Financial costs and time demands make it difficult for the family physician, especially in solo practice, to follow the many recommendations offered in the literature. The purpose of this study was to identify the most helpful selection factors used by family physicians who had already purchased an office computer.**

Methods: **In May 1990 an 18-item questionnaire was mailed to a random sample of 26 percent of the 1167 active members of the Washington Academy of Family Physicians. A final response rate of 45 percent was achieved. Twenty-three percent of the nonresponders were contacted to obtain information about practice demographics and office computer status.**

Results: **Seventy-three percent of responders reported using a computer in their practice. The mean cost ranged from $17,300 for solo practitioners to $55,000 for multispecialty groups. Respondents who reported performing a prepurchase needs assessment, involving the office staff in the decision process, and making cost comparisons were more satisfied with their computer systems than those who did not ($P < 0.05$). Satisfaction and acceptance were lower and negatively related to an increasing amount of time needed for the system to become fully operational ($P < 0.01$). The level of involvement by the practitioner in the decision process was highly predictive of satisfaction with a computer system: those physicians who were most involved were also the most satisfied.**

Conclusions: **Family physicians responsible for selecting an office computer for their practices are advised to become personally involved in the decision process, evaluate the practice's needs and goals, involve the office staff, and compare costs before choosing a system. A set of guidelines for selecting an office computer is presented. (J Am Board Fam Pract 1992; 5:275-80.)**

Many family physicians are now using office computers, with reported rates between 20 and 45 percent.[1,2] When surveyed in 1988, 74 percent of the graduates of the University of Washington Family Practice Residency Network used office computers. While most general or family physicians who use office computers find them useful,[3,4] expense, inexperience, and lack of time and acceptable software have been cited as barriers to broader physician use.[5] Selection of a computer and accompanying software is one of the first tasks the busy physician must accomplish for successful office automation. The large number of options makes the selection process difficult. One directory lists more than 150 programs for office management alone.[6]

Numerous medical and health administration articles give advice on selecting office computer systems.[7-13] Most authors suggest the need to evaluate the practitioner's current and future billing and office management needs, to send a written request for proposal (a formal bid) to computer vendors, to make one or more visits to offices with comparable computer systems (site visit), and to check vendor references.[14-19] One authority advises against choosing a system entirely on the basis of cost.[20] Many advocate hiring a computer consultant and involving the physician's office staff in the decision process.[7,8,13,21,22] These recommendations, however, have been based largely on anecdotal experience, and some question their importance.[23,24] To date, there are no reports whether family physicians follow these suggestions, nor do we know whether those who do are more likely to be satisfied with their chosen system.

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The purpose of this study was to determine the process by which Washington State family physicians selected an office computer system and how this process correlated with subsequent satisfaction.

Methods

In May 1990 a 5-page, 18-item questionnaire was mailed to a random sample of 300 (26 percent) of the 1167 active members of the Washington Academy of Family Physicians. To maximize the response rate and accuracy of the answers, recipients were asked to give the survey to the person in the practice best able to answer the questions. After two mailings, 150 (50 percent) questionnaires were returned, of which 136 (45 percent) were usable. One hundred twenty-one (89 percent) of the surveys were filled out by physicians, and 13 (10 percent) by office administrators. In two cases (1 percent) the responder's position was not identified. A random sample of 35 of the 150 nonresponders (23 percent) were contacted by telephone to obtain abbreviated information about practice demographics and office computer status.

Table 1 displays the information requested and the number of responses obtained for each item. Factors used in selecting a computer were evaluated on a 5-point modified Likert scale (1 = not important, 5 = very important). Separate questions addressed the issue of how important a given factor was in physicians selecting their own computer and how important that factor should be if they were to purchase another computer today. Satisfaction was assessed by analyzing the responses to two groups of questions. Respondents were asked to rate on a 5-point scale the level of computer acceptance (1 = not accepted, 5 = very accepted) by various members of their practice. They were also asked to rate the level of satisfaction with various components of their computer system (1 = not satisfied, 5 = very satisfied).

Statistical analysis included unpaired t-tests, chi-square, one-way analysis of variance (ANOVA), and Pearson's correlation.

Table 1. Survey Information Requested of All Respondents (n = 136) and of Computer Users Only (n = 99).

Survey Information	Number of Respondents
All respondents	
Status of office automation	136
Practice characteristics	136
Size of community in which the practice is located	136
Respondent's position in the practice	134
Length of time (age) the practice has been in operation	133
Feelings about the use of computers in family practice	129
Computer users only	
Purpose of the computer (computerized applications)	99
Respondent's involvement in the decision process	89
Age of computer since installation	89
Time required for the computer to become fully operational	85
Acceptance of computer by office staff	85
Type of computer system used	81
Factors used in selecting a computer	81
Importance of factors	81
Importance of factors if purchasing a computer today	80
Satisfaction of respondent with computer	79
Total cost of system, including hardware, software, and service contracts	79
Concurrent use of manual system	77

Results

Computer Use in Practice

Seventy-three percent of the respondents (99/136) used a computer in their practice. The great majority (94 percent) owned, rented, or leased an office computer system. Only six practices used an off-site service bureau.

Group practices were significantly more likely than solo practices ($\chi^2 = 10.2$, $P = 0.017$) to use an office computer: 86 percent of multispecialty groups (25/29), 77 percent of family practice groups (50/65), 52 percent of solo practices (16/31), and 73 percent of other institutional settings (8/11) had office computers. There were no significant differences in location, community size, or age among the practices when analyzed by the type of practice.

Seventy-seven percent of the nonresponders (27/35) reported using computers. Nonresponders were comparable with responders in community size and age of the practice, although they were more likely to belong to a group practice. This difference, however, was not statistically significant.

One hundred twenty-nine responders answered the question concerning their positive or negative beliefs about the use of computers in family practice. Of the 96 who used computers, 80

(83 percent) were positive while only 6 (18 percent) of 33 nonusers were positive about computers. None of the 96 respondents who used computers reported negative beliefs. Of the 33 nonusers, 7 (21 percent) were negative and 20 (61 percent) were neutral about computers in family practice. These differences in beliefs between users and nonusers were highly significant (F ratio = 88; $P < 0.01$).

Computer System Characteristics

The results that follow were derived from computer users only. Because not all of the 99 respondents with computers completed the entire questionnaire, the "n" for each scored question is indicated within parentheses. The median for computer use was 3 years, with 11 percent using a computer less than 1 year (10/89) and 20 percent more than 5 years (18/89). Thirty percent (26/85) of the computer systems were fully operational within 1 month and 88 percent within 8 months of installation. Only 53 percent (41/77) of the respondents ran a concurrent manual system during implementation of the computer system. The mean cost ranged from $17,300 for solo practitioners to $55,000 for multispecialty groups (Figure 1).

Respondents reported using a variety of computer systems. Nineteen percent (15/81) operated single-user personal computers, while 58 percent (47/81) used an on-site microcomputer- or minicomputer-based network with multiple terminals. Only 23 percent (19/81) used an off-site mainframe computer.

Patient billing (93 percent) and insurance claims preparation (83 percent) were the most commonly used computer applications; however, 41 percent of the practices also used patient-care-related computer applications, such as patient reminders. Additional applications are shown in Figure 2.

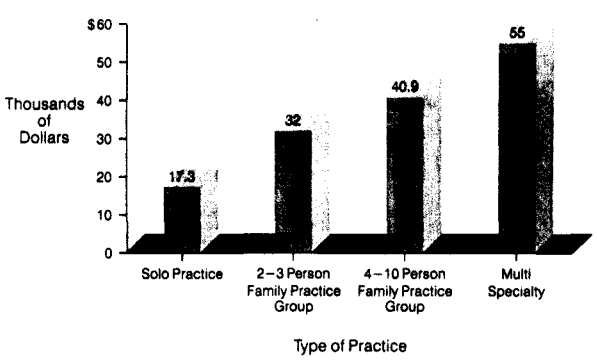

Figure 1. Mean cost of computer system (including hardware, software, and service contracts) by type of practice.

Selection Factors and Satisfaction

Table 2 shows which selection factors were used, ranked from most to least frequent. It also shows the mean value of how important the respondents believed each factor was for them and how important each factor should be in a computer selection process. Only a needs assessment was used by more than 50 percent of the respondents. The mean for the number of factors used in the decision process was 3.1.

For all respondents the mean level of satisfaction with their computer system was 3.5 on a 5-point scale. Respondents were most satisfied with accounting audit trail, system reliability, and time savings (Table 3). Table 3 also shows the level of acceptance of the computer by various persons in the practice.

The relations among selection factors, satisfaction, and acceptance were analyzed by a one-way analysis of variance (ANOVA). Those respondents who reported using these methods — a needs assessment, cost comparisons, and staff involvement in the decision process — were more satisfied and accepting than those who did not ($P < 0.05$). Respondents who reported checking vendor references and visiting a practice with a similar computer system were more satisfied with their computer than those who did not, although the differences were not significant at the $P < 0.05$ level. The amount of personal input was the single most important factor in predicting satisfaction and acceptance (F ratio = 17.4, $P < 0.001$).

Selection factors that were not significantly related to satisfaction or acceptance included seeking the advice of an outside consultant, business manager, or colleague, as well as using a written request for proposal, even when analyzed by practice type (solo practice, family practice group, or multispecialty group). Other factors that did not correlate with satisfaction or acceptance included concurrent manual billing during system implementation, cost of the computer, number of years since acquiring a computer, age of the practice, and size of the community. Satis-

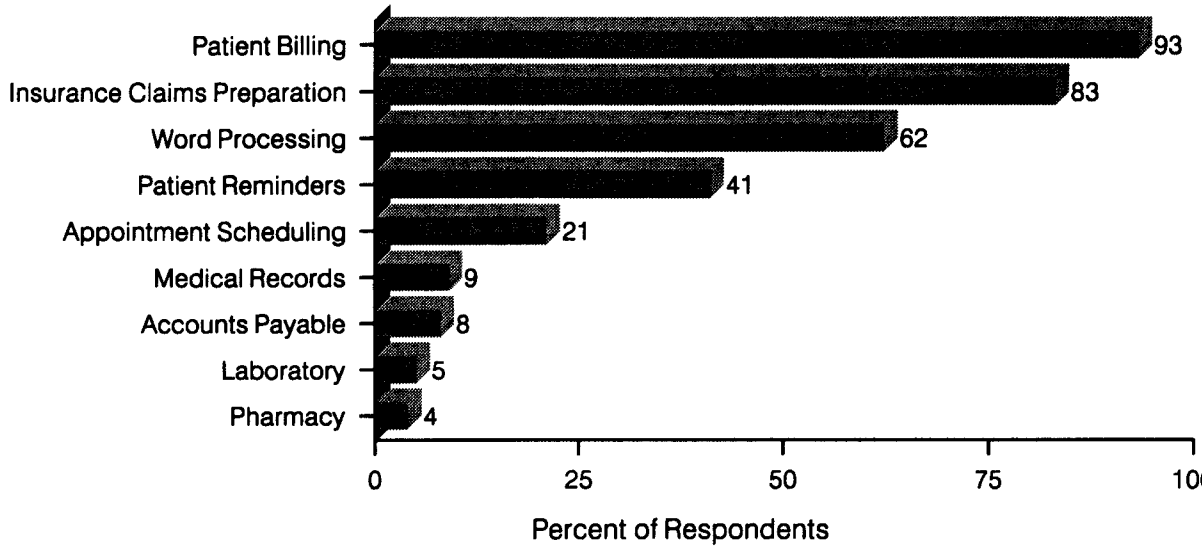

Figure 2. Percentage of respondents who reported using a computer for various medical office applications.

faction and acceptance were lower and negatively related to an increasing amount of time needed for the system to become fully operational ($P < 0.01$).

Discussion

A central finding of this survey was that the amount of input the respondent had in the decision process was most predictive of perceived satisfaction. Much of the literature either implies or suggests that the physician be integrally involved in the selection process and that the decision not be delegated to an office worker or outside consultant.[10,11,14,16,17,22]

Several other recommendations found in the literature for selecting a computer system are supported by our findings. In our study satisfaction was higher in those practices where a needs assessment and cost comparisons were done. Staff acceptance and involvement in the decision process also correlated with satisfaction.

Although many authors have stressed the importance of checking vendor references, visiting a practice with a similar computer system, and submitting a written request for proposal, fewer than 1 in 3 respondents in this study actually did these recommended activities (Table 2). Checking references and visiting sites did, however, correlate with satisfaction

Table 2. Selection Factors Actually Used versus Ideally Recommended by Respondents.

Selection Factor	Percent of Respondents Who Used Factor	Mean Actual Importance Rating*	Mean Ideal† Importance Rating*	Significance of Difference between Actual and Ideal *P* Value
Needs assessment	55	4.2	4.6	< 0.01
Cost comparison	43	3.8	3.9	N.S.
Staff involvement	35	3.4	3.9	< 0.01
Advice of business manager	32	3.3	3.8	< 0.05
Site visit	32	3.3	4.1	< 0.01
Advice of outside consultant	31	2.7	3.2	< 0.01
Request for proposal	27	2.8	3.2	N.S.
Advice of colleague	26	2.7	3.0	N.S.
Vendor references	25	3.2	3.4	N.S.

*1 = not important, 5 = very important.

†Derived from the question "Please rate each of the following factors in terms of how important the factor *should be* in the selection of a computer system assuming you were to choose a new system today."

Table 3. Measures of Satisfaction: Satisfaction and Acceptance Components.

Components	Mean Rating
Satisfaction with*	
Accounting audit trail	4.0
System reliability	3.9
Time savings	3.8
"User friendly"	3.6
Vendor support	3.5
Final cost of system	3.2
Ease of modification	3.1
Documentation and user's manual	2.9
Mean satisfaction	3.5
Acceptance by†	
Respondent	4.5
Front office staff	4.5
Physicians	4.3
Patients	4.1
Nurses	3.9
Mean acceptance	4.3
Mean satisfaction and acceptance	3.8

*1 = not satisfied, 5 = very satisfied.
†1 = not accepted, 5 = very accepted.

and may be worthwhile procedures. Writing a request for proposal, though, is a time-consuming process that possibly can be omitted without significant impact on satisfaction.

The significant differences in the ratings of how important a given selection factor should be and how important it was in practice (Table 2) have implied that the selection process itself was "educational" and that perhaps, given another chance, the respondents would assess the needs and goals, involve the staff and business manager, visit a practice with a similar system, and hire an outside consultant. With the exception of the needs assessment and involving the office staff, however, those practices that did use the above factors were not significantly more satisfied than those who did not.

Although some authors have recommended operating a manual billing system during computer implementation,[7,8,22] only one-half of the practices in this study did so. Those practices that did were not more satisfied than those that did not. As expected, the practices that experienced delays in implementing the computer system were significantly less satisfied than those that did not.

Compared with previous studies, our survey results showed a higher than anticipated proportion of family physicians (73 percent) who use an office computer. A likely explanation for this finding is that physicians in general are becoming increasingly dependent on computers to assist them in office management. As might be expected, because of more complex billing and scheduling needs, multispecialty groups are more likely to use a computer than solo practitioners. Computer systems in multispecialty and group practice also are more expensive than those in solo practitioners' offices. Family physicians are using computers for more purposes than previously reported,[1,2] including health maintenance reminders, medical records, and other patient care tasks (Figure 2).

Conclusion

Several books and articles offering recommendations for choosing an office computer system have been published.[7-19,21,22,24] This study assessed which of these recommendations correlated with final satisfaction. Only the prepurchase assessment of practice needs and goals, cost comparison shopping, and involving the staff in the decision process correlated with a high level of satisfaction. Not surprisingly, personal involvement in the decision process was most predictive of satisfaction.

The low usable response rate (45 percent) to this survey could have biased the final results. Nonresponders, however, were comparable with responders in terms of computer usage, community size, and age of the practice. Because responders were likely to be owners or partners of their practice, one would expect that they would be both financially and psychologically invested in their office system. Although the difference was not significant, that responders were more likely than nonresponders to be in a solo practice or family practice group suggests that these results might not be as readily applied to family physicians in multispecialty groups.

Based on the results of this study, we offer the following guidelines for selecting an office computer:

1. Physicians responsible for the financial aspect of the practice should be personally involved in the computer selection process.
2. It is important to evaluate the needs and future goals of the practice to get a good computer "fit."

3. Evaluate several systems and be sure to compare costs. Many excellent, inexpensive systems exist. Expensive does not mean better.
4. Involving the office staff in the decision is important.
5. Investigating the vendor's service, reliability, and experience by checking references, as well as visiting a practice with a similar system can be helpful.
6. A formal written request for proposal is probably not necessary, especially for a small practice.
7. Hiring a computer consultant or following the advice of a colleague might not be as helpful as previously assumed.
8. It might not be helpful to run a concurrent manual system during implementation. Rather, it is important to select a system that can be fully operational within a few months. Delays in installation and implementation lead to frustration and discontent.

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