

**Original Article**

## Women Physicians Are Early Adopters of On-line Continuing Medical Education

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### Abstract

**Introduction:** *On-line continuing medical education (CME) provides advantages to physicians and to medical educators. Although practicing physicians increasingly use on-line CME to meet their educational needs, the overall use of on-line CME remains limited. There are few data to describe the physicians who use this new educational medium; yet, they clearly are the innovators and early adopters who will facilitate the growth of this educational technology. It would be useful to instructional designers and CME developers to better understand the characteristics of this influential group.*

**Methods:** *We studied the actual use of several different on-line CME programs within three different groups of physicians. The on-line programs were developed as part of research studies funded by the National Institutes of Health, with no relationship to commercial interests. They were presented to physicians using mass mailouts (two physician groups) or personal contact and were accompanied by incentives to reduce resistance to the new technology. We compared the characteristics of physicians who chose to use these on-line programs with demographic data from larger populations representing the groups from which these users originated.*

**Results:** *We found that physicians who used these on-line CME programs were younger than average and, importantly, more likely to be female than expected. This finding was consistent across different types of physician populations and different types of CME programs.*

**Discussion:** *Based on data reflecting actual use of on-line CME, younger physicians appear to be adopting on-line CME more rapidly than others, and women physicians appear to be adopting on-line CME at a faster rate than their male counterparts. This latter finding conflicts with the impression provided by some survey-based studies that male physicians are more likely than female physicians to use on-line CME. The data suggest that the growth of on-line CME is most likely occurring in diffusion networks dominated by relatively new medical school graduates and, possibly, women physicians. These results provide valuable insight to those who seek to develop and market on-line CME and those who seek to reach women physicians with CME programs.*

**Key Words:** Continuing medical education (CME), continuing physician professional development, distance learning, Internet, women physicians

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### Introduction

Physicians are increasingly turning to the new educational medium of Internet-based (on-line) continuing medical education (CME). Data from the Accreditation Council for Continuing Medical Education (ACCME) document that the total number of Internet CME hours increased 500%

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between 1998 and 2002 and that physician involvement increased almost 900%.<sup>1</sup> Recent survey data suggest that 78% of physicians use the Internet<sup>2</sup> and that the second most important reason for doing so, after personal use, is CME.<sup>3</sup> Other studies have found that approximately 90% of physicians use the Internet and that 31% of physicians report using the Internet for CME.<sup>4</sup> Such data imply that Internet CME already is widely used by physicians. However, news reports, looking at much of the same information, have come to the opposite conclusion: "...physicians have yet to embrace [CME] online."<sup>5</sup>

The practical reality is that the use of Internet CME is growing rapidly and that many physicians probably have some experience with it, but that it still represents a very small percentage of the overall CME experience. In 2001, for example, only 6.6% of 42,155 CME activities sponsored by ACCME-accredited providers were Internet based. Thus, on-line CME is an educational innovation that is still in the early stages of growth and diffusion.

There are clear reasons to expect that the growth of on-line CME will continue and, most likely, accelerate. For instance, on-line CME has obvious economic attractions for physicians. Much of what is now offered is free. Additionally, compared with traditional conference-based CME, physicians can take on-line CME at their convenience, without the expense of conference fees, travel, or lost practice income.

On-line CME is also attractive to medical educators and others with an interest in improving physician performance. The typical live lecture or journal article that is widely used for CME is ineffective in improving performance. As noted by Davis et al.,<sup>6</sup> "...where performance change is the immediate goal of a CME activity, the exclusively didactic CME modality has little or no role to play." Instead, "...interactive techniques, such as case discussion, role play, or hands-on practice sessions, [are] generally more effective." Mazmanian and Davis<sup>7</sup> further emphasized the benefits of interaction and the addi-

tion of enabling technologies (such as patient education materials) to improve the effectiveness of CME. Computer-based CME programs, distributed via the Internet, offer the potential for ongoing needs assessment, interactivity, incorporation of enabling technologies, and a number of other capabilities that are associated with greater effectiveness than standard CME approaches. The potential educational superiority of on-line CME is supported by other studies demonstrating that technology-based instruction, in general, can reduce time to achievement and improve skills and knowledge compared with typical classroom-based approaches.<sup>8</sup>

Despite its growing use and attraction to physicians, medical educators, and others interested in medical quality improvement, little is known about the characteristics of physicians who are most likely to use on-line CME today. Information on these physicians is important because they represent the influential group of "innovators" and "early adopters," the opinion leaders associated with the acceptance and diffusion of any new technology.<sup>9</sup> Such data as do exist come from surveys of physicians, not from actual use patterns. For example, Casebeer et al.<sup>4</sup> reported on 2,200 physicians who responded to their survey and observed that male physicians reported using the Internet longer, using it more frequently, and being more likely to use it for CME than female physicians. These data would lead to the conclusion that male physicians are the innovators and early adopters of on-line CME. However, such results could be due to sampling bias if female physicians were underrepresented in the survey or to reporting bias if male physicians systematically overestimated their actual use. Additionally, this study did not provide information on the age of those physicians who reported using on-line CME. A better understanding of CME user demographics based on actual use patterns would enable those who develop on-line CME programs to more accurately anticipate the needs of current on-line CME users and to better understand the most likely pattern of adoption of on-line CME.

**Table 1 Important Study Characteristics and Number of Potential CME Users**

<b>CME Program (Hours Credit)</b>	<b>Group 1: Skin, Breast, Prostate Cancer (17 hr)</b>	<b>Group 2: Skin Cancer (12 hr)</b>	<b>Group 3: Domestic Violence (3 hr)</b>
When studied	2001	2002	2001
Location of target group	Santa Clara County, CA	Southern California	Kansas
Number of physicians in target group	4,358 MDs in all specialties	50 primary care MDs	2,000 primary care MDs
How program promoted	Mailed flyer	Fax and personal visits	Fax and letters
Additional study requirements	Completion of on-line survey of cancer screening practices	None	Completion of written survey, randomized to CME, no CME
Additional incentives	\$100 for completing all CME programs	\$50 for completing CME program	\$100 for completing both surveys and CME
Physicians taking CME (% of target group)	97 (2.2)	14 <sup>16</sup> (28)	31 (1.6)

CME = continuing medical education.

### CME User Demographics

We recently studied the use of different types of on-line CME in three different groups of physicians. All physicians were engaged in the active practice of primary care medicine and represented typical community physicians rather than Internet users or persons with a specific interest in a CME topic. We offered all physicians in the target groups the opportunity to voluntarily complete Internet CME programs providing American Medical Association (AMA) Category 1 or American Academy of Family Physicians Prescribed Credit at no charge. We also offered all physicians a modest financial incentive to complete the programs. Although these conditions may not represent the typical on-line CME experience (where, for example, physicians may have to pay for CME credit), we believed that they were important in overcoming resistance to on-line CME and attracting an adequate group of physicians for research study purposes. The major characteristics of the three physician groups and the accompanying research studies are shown in Table 1.

The on-line CME programs we studied were interactive, evidence-based, problem-solving courses dealing with cancer prevention and the management of domestic violence. The CME programs were designed for primary care physicians, physicians' assistants, and nurse practitioners. The development of the courses was supported by National Institutes of Health funding and was not associated with outside commercial interests. Additional information on these courses, their content, and their educational effectiveness has been reported elsewhere.<sup>10-13</sup> Studies have shown that these programs can improve important educational outcomes and that they are very highly regarded by users.

Two of the target (study) groups (1 and 3; see Table 1) were derived from large, unselected lists of physicians practicing in defined geographic regions. We promoted the on-line CME programs to these physician groups via written materials (see Table 1). As might be expected from a mass solicitation, the physicians who actually chose to use the on-line CME programs represented only a small percentage (1.6%–2.2%) of the total physicians in these groups.

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**Table 2 Demographic Characteristics of Comparison Physician Populations**

Population	All U.S. MDs*	All California MDs†	Southern CA IPA PCPs	All Kansas MDs‡
Number of MDs	836,156	99,567	50§	6,534
Female (%)	24.6	24.7	8.0	21.9
Average age (yr)	49.2	51.1	49.7	49.7
Average age male (yr)	51.2	53.3	50.4	51.6
Average age female (yr)	43.3	44.4	46.1	43.0
White (%)	Unknown	74	84	86
African American (%)	Unknown	3	0	2
Asian/Pacific Islander (%)	Unknown	20	16	11
Native American (%)	Unknown	0	0	0
Other (%)	Unknown	3	0	1

IPA = independent practice association; PCP = primary care physician.

\*Source: AMA + estimates based on AMA data.

†Source: AMA + estimates based on AMA data, California Workforce Initiative.

‡Source: AMA + estimates based on AMA data, estimates from Kansas Department of Health.

§There were 48 physicians and two nurse practitioners in this group.

The third study group was a panel of 50 primary care practitioners (96% physicians, 4% nurse practitioners) from a large Southern California independent practice association (IPA) who were chosen by the IPA's medical director based on their participation in the IPA rather than their interest in the subject matter (skin cancer) or in on-line education. This situation, which is more representative of organizational use of on-line CME as part of a quality improvement initiative, proved to have a much higher use of on-line CME: 28% of all practitioners. The on-line skin cancer program was promoted to these physicians/practitioners via a letter from the IPA medical director and personal contact from the IPA's provider relations representatives.

Table 2 presents basic demographic data from groups that either represent the original target group (e.g., all 50 IPA practitioners) or serve as proxies for these groups (e.g., all U.S., California, or Kansas physicians). These data provide demographic reference points that can be compared with data from the on-line CME users. Although less than perfect comparisons, they do allow us to understand whether physicians who chose to use our on-line CME pro-

grams seemed to differ in important characteristics from physicians in general.

The data show that most practicing physicians in all comparison populations were white males and that the age of the average practicing physician, depending on the population, was 49 to 51 years. Importantly, because of recent efforts to increase the number of women medical students, the typical female physician was younger than the typical male physician by as much as 9 years.

Table 3 shows the demographic characteristics of persons who actually completed the on-line CME programs. These data demonstrate that physicians who used these programs were younger than physicians in any of the comparison groups (see Table 2). This was true for both male and female physicians. For example, the average age of on-line CME users in Santa Clara County, California (Silicon Valley), was 41.1 years, whereas the average age of the comparison group, all California physicians, was 51.1 years.

Table 3 also suggests that there was a higher use of these on-line CME programs by women physicians than would be expected from their representation in the comparison populations. For

**Table 3 Demographic Characteristics of On-line CME Users**

<b>CME Program (Hours Credit)</b>	<b>Group 1: Skin, Breast, Prostate Cancer (17 hr)</b>	<b>Group 2: Skin Cancer (12 hr)</b>	<b>Group 3: Domestic Violence (3 hr)</b>
Physicians taking CME (% of target group)	97 (2.2)	14 <sup>16</sup> (28)	31 (1.6)
Female (%)	42.9	42.9	35.5
Average age (yr)	41.1	44.8	42.9
Average age male (yr)	43.2	46.3	44.3
Average age female (yr)	38.5	42.7	40.3
White (%)	51.0	85.7	93.5
African American (%)	1.0	0.0	0.0
Asian/Pacific Islander (%)	39.6	14.3	6.5
Native American (%)	2.1	0.0	0.0
Other (%)	6.3	0.0	0.0

CME = continuing medical education.

example, only 8% of the Southern California IPA physicians were women, but 43% of the on-line CME users from this group were women. Indeed, the lowest percentage of female users of any on-line CME program (35%; see Table 3) exceeded the percentage of females in any comparison population. This finding is evident in all groups and, thus, is unlikely to be due to local factors or specific program content. The racial/ethnic data suggest that physicians who considered themselves Asian or Pacific Islanders were disproportionate users of on-line CME in Santa Clara County but not in other locations.

To the extent that female physicians were eager users of our on-line CME programs, did they appear to have particular educational interests? Data obtained from the Santa Clara County group suggest that this was so. The Santa Clara County (group 1) data shown in Table 3 include all physicians who completed at least one on-line CME program in skin cancer prevention and treatment, breast cancer prevention and treatment, or prostate cancer prevention and treatment (physicians were free to take one, two, or three programs). We analyzed the use of each CME program separately and found that women physicians had

the greatest interest in breast cancer (37/77 users; 45.4%), followed by skin cancer (27/67; 40.3%), and prostate cancer (22/67; 32.8%).

The Southern California IPA experience provided us with an additional opportunity to explore why physicians did *not* use on-line CME, even if an honorarium was provided along with free CME credit. After completion of the project, we surveyed the non-CME-using physicians. Of the 36 physicians (of 50) who did not respond to the CME offer, only a minority (11; 31%) were unaware of it. When asked why they did not use the program, 29% of the 21 reasons given were that the physician(s) did not need CME credit or feel a need for education in the subject (skin cancer). The primary reason for not using the course was lack of computer capability or skills (48%). In fact, most of the nonusers (63%) had not yet used the Internet to obtain *any* CME. These data reinforce the notion that on-line CME is a technology that is still early in the diffusion process.

## Discussion

One explanation for the unexpectedly high use of on-line CME by female physicians in our studies

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(35.5%–42.9%) might be that on-line CME is more attractive to younger physicians in general. Indeed, the increased use of on-line CME by younger physicians was one of our findings. If a much higher percentage of younger physicians are female, compared with physicians in general, age alone might explain the higher percentage of women users than would be expected from overall population data (such as shown in Table 2). AMA data<sup>14</sup> suggest that age was a factor, but not to an extent that explains our findings. For example, 35.9% of all U.S. physicians under age 45 are female. The corresponding numbers for California and Kansas are 39% and 33.4%. Thus, even if *all* users of these on-line CME programs were physicians under age 45 (which was not the case), female physicians still seemed to use on-line CME in higher proportions than they were represented in the population(s).

Another explanation for the higher use of on-line CME by female physicians than would be expected from their representation in the comparison populations could be that the comparison populations consisted of physicians from all medical specialties, whereas the on-line CME programs targeted primary care physicians (particularly family physicians and internists) rather than physicians in general. If women physicians are more common in primary care specialties than in the general physician population, the subject matter of the programs, because of its attraction to primary care specialties, might explain the disproportionate use by women physicians. Such a discrepancy, however, would be relevant only in groups 1 and 3 (from Table 3), where the comparison populations were based on statewide data.

We were unable to obtain gender-based specialty information for California and Kansas, but such data are available for all U.S. physicians.<sup>14</sup> These data show that, in 2001, 29.8% of family physicians and 28.5% of internists were women. Although these percentages are higher than the overall U.S. average (24.6%), they are far lower than the percentages of female users of our on-line

CME programs. Thus, we believe that the specialty mix of the programs is unlikely to account for the much higher use of these programs by women physicians than would be expected from their representation in our comparison populations.

These data lead to a conclusion that, on a one-to-one basis, women physicians are more interested in on-line CME than their male counterparts. Although this conclusion may be surprising to some, it is supported by similar findings from other sources. In particular, U.S. census data<sup>15</sup> show that males were more likely than females to be Internet users prior to 1997, but this difference has now disappeared. The Bureau of the Census also notes that between the ages of 20 and 50, women are now *more* likely to be Internet users than men.<sup>15</sup>

Our findings have important practical implications for CME providers. Because the vast majority of practicing physicians are men, studies are likely to show that more men than women use on-line CME. However, any bias based on such findings (i.e., women physicians are *less likely* to adopt this technology than men physicians) should be discarded. Indeed, the reverse appears to be true: women physicians appear to be adopting on-line CME more rapidly than men.

Rogers<sup>16</sup> notes that an innovation is initially tested, adopted, and promoted by persons who are innovators and early adopters (the opinion leaders) and that innovations subsequently expand (diffuse) via networks of users who are similar (homophilus). In terms of understanding the likely growth of on-line CME, our data suggest that younger physicians are the early adopters and that they will likely spread it to their younger colleagues. Based on our findings, we also believe that a higher rate of adoption and early spread will be seen in women physicians than in male physicians. Those organizations seeking to develop a market for their on-line CME activities might consider targeting the educational needs of women physicians or advertising their programs to this group. Equally importantly, those organizations whose CME programs appeal to women physicians

### Lessons for Practice

- Physicians who are currently using on-line CME are more likely to be younger and female than the typical physician.
- CME providers wishing to increase the use of on-line CME might target younger physicians in general and female physicians in particular.
- CME providers or medical educators wishing to meet the educational needs of women physicians should consider on-line CME as an attractive technology.

more than to their male counterparts might consider using on-line programs to reach their market.

Our data also provide some information on the success of various marketing campaigns. As shown in Table 1, the typical direct mail/fax campaign achieved a 1.6% to 2.2% uptake. This finding is consistent with our other efforts to promote on-line CME via direct mail. In contrast, a focused, personalized campaign, targeting specific physicians in an IPA, achieved a 28% uptake. We believe that this degree of CME use is as good as or better than that achieved by a typical medical organization that offers nonmandatory internal CME via journal or live lecture.

There are, of course, limitations to our data. Our conclusions rest on the assumption that the differences between our on-line CME users and the comparison populations are real and not artifactual. We have discussed some of these issues above, but there could be others of which we are not aware. If, for example, the demographic mix of all Santa Clara County physicians differed markedly from all California physicians and, in fact, resembled the demographic mix of our on-line CME users, attributing our findings in Santa

Clara County to a preference for on-line CME among younger and female physicians would be a mistake. Instead, our findings could be explained by random selection. We used the most applicable publicly available data and have no reason to believe that subgroups within these data sets (e.g., Santa Clara County physicians versus all California physicians) differed markedly from the larger group(s), but we cannot guarantee that such differences did not exist. Our findings from the Southern California IPA, where we did have accurate demographic data on the entire group from which the on-line CME users originated, are consistent with our conclusions and lead us to believe that our findings are not due to an inappropriate selection of comparison populations.

Our data show consistency across geographic areas, but they reflect, at best, the interests of primary care physicians, not specialists or subspecialists whose educational needs (and demographic profiles) might be different. Additionally, these data are from a moving target. We believe that they provide valuable insight into the early adoption of on-line CME but that the demographic (and other important) characteristics of on-line CME users will change as the technology matures and diffuses.

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