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Seniors' Internet Use and Preferences for Web-Based e-Health Resources

Linda E. Moody, Ph.D., M.P.H., F.A.A.N., B.C.,[1] Cheryl Dee, Ph.D.,[2] Ara Rogers, Ph.D.[3]

[1]Distinguished Professor, Lewis and Leona Hughes Endowed Chair, Nursing Informatics, College of Nursing, University of South Florida, Tampa, FL 33612
[2]Assistant Professor, Department of Library Science, University of South Florida, Tampa, FL 33610
[3]Director, Senior Programs, Department of Gerontology, University of South Florida, Tampa, FL 33610

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Abstract

E-health Internet portals provide health information resources and services in the home for those with chronic illness or consumer health questions. Yet, these resources remain mostly an untapped resource among the elderly. This descriptive study identified needs, preferences, and uses of Internet based health resources and healthcare services among older adults in Southwest Florida. In addition, the study measured seniors' ratings of their perceived self-efficacy with computer and related e-technology. The convenience sample of older adults in a Senior Net program comprised 60 females (59.4%) and 43 males (40.6 %). Mean age was 71.18 (sd 7.20) and age range was 56 to 84. Ethnic and racial distribution of the sample was 86 % white, 3% African American, 1 % Hispanic, and 9% Other. The majority, 53%, reported a college-level degree. Of the 103 respondents, 55% reported daily Internet use; 75% had 1> chronic conditions; and, 78% indicated preference for web-based resources to help manage medications and chronic diseases. The self-efficacy scale was assessed to have high reliability: Cronbach's coefficient alpha (r = .93). Men reported a greater degree of self-efficacy than women did in learning to use new devices and new software. Results are consistent with previous studies indicating that baby-boomers will demand more Internet-based healthcare services than the current generation of seniors. Findings may inform the design of future customized web portals to increase self-management and coping skills of seniors with chronic diseases.

Background and Purpose

With the Internet becoming an increasingly important resource for informed decisions about health and health care, a recent national survey of older Americans by the Kaiser Family Foundation[1] reported that less than a third of senior citizens who are 65 and older have ever been online, yet 70 percent of the next generation of seniors, 50 to 64 years old, have been online. The differences between senior citizens and 50-64 year-olds are striking and indicate that online resources for health information may soon play a much larger role among older Americans, especially those in rural areas.[2] The Kaiser study also found that 21 percent of seniors have been online to look for health information compared to 53 percent of 50-64 year-olds; 8 percent of seniors access "a lot" of health information online compared to 24 percent of 50-64 year-olds.[1] The Kaiser study found that the Internet is fifth on a list of media sources of health information for seniors compared to first among 50 to 64 year-olds; and 26 percent of seniors trust the Internet "a lot" or "some" to provide accurate health information, compared to 58 percent of 50-64 year-olds.[1]

Recent studies have also reported that a significant digital divide could leave those most in need with less information on which to base important health care decisions. For ex-

ample, seniors whose annual household income is under $20,000 a year are much less likely to have gone online than those with incomes between $20,000-49,000 (40 percent) or those with incomes of $50,000 a year or more.[1,2] This is of concern because rural areas have higher percentages of people in poverty, elderly people, people without health insurance, and people with chronic diseases. As a way of ameliorating these disparities, e-health initiatives are being implemented to address this digital divide.[2, 3] The psychosocial benefits of providing training to older adults on how to gain access and use Internet services has been demonstrated in studies such as the randomized clinical trial by White and colleagues [4] and advances in home-health based technologies.[5]

The purpose of this study was to explore the current and past history of computer and Internet use among elders; assess their health-seeking behaviors, their perceived self- efficacy of computer and related technology use; and, their needs and preferences for health related resources and services on the Internet. The following research questions were addressed:

1. What are the characteristics of older adults who have access to the computers and the Internet; what are their health-seeking behaviors online; what resources do they use most often and how helpful are they?

2. What are the perceived needs and preferences of older adults for health-related information, resources, and services that are Internet-based?

3. What are elders' perceived self-efficacy of using computers and related technology?

4. What factors predict seniors' use of a customized e-health portal for the management of chronic diseases?

Seniors' Internet Usage in the US

The Internet provides an abundance of health information that can be of substantial benefit to seniors. But, seniors are generally less inclined to seek information online than younger populations.[6] Internet usage has increased in most age groups in the past decade, but Internet usage remains "strongly associated with the age of the individual."[7] Although adults over the age of 65 make up 13% of the American users, they account for a mere 4% of the online population in the United States.[8] A study by the Department of Commerce in 1996 found that seniors had the lowest levels of computer usage (21.0%) and Internet usage (8.8%).[7] By 2001, Internet usage by adults over the age of 65 had only risen to 15%.8 This age gap crosses national boundaries in Internet connectivity and usage in every nation.[9] In Florida, 23 percent of the population is 60 years of age or older, with seniors being the states fastest growing age group. With the population density of elderly in Florida, chronic diseases are prevalent: 70% of those over 65 years of age have one or more chronic diseases or disabilities.[10] This has created the need to provide more cost-effective methods for chronic disease management in this population, including electronic technologies.

Seniors' Health Information Seeking Behavior

Seeking health information is one of the main reasons seniors use the Internet, second only to email, and this particular information-seeking behavior has not been associated with income or education.[8] Though seniors are less likely to perform many online activities other than e-mail, they are far more likely than any other age group to check health information online.[11] Of those seniors online, in the United States, 66% regularly use the Internet to gather information and advice on medical issues, and 80% of adult Internet users have searched online for health information at least once.[9] Moreover, because the population of older adults is one of the fastest growing demographic groups in the country, the importance of accessible and understandable medical information is critical to the nation's health.[12]

Seniors' "Resistance" to the Internet

One suggested reason for the digital divide within the same country is in the resistance by some seniors to use the Internet. However, recent surveys of elderly (>65) and older adults[13] are somewhat conflicting. A national, random digit dial telephone study by the Kaiser Health Care Foundation in 2005 investigated Internet use among 1,450 adults age 50 and older, including 583 respondents age 65 and older.[1] The national survey found that even though the Internet has become an increasingly important source for decisions about health and health care options, only one-third of current seniors (> 65 years) have ever gone

online. However, more than two-thirds of the next generation (baby boomers) have done so.[1] The differences among older seniors (65 years and older) and older adults (50-64 year-olds) are striking, indicating that online resources for health information may soon play a much larger role among the next generation of older Americans. Other findings from the Kaiser study were notable: the Internet is 5th on a list of media sources of health information for seniors compared to first among 50-64 year-olds. About one-quarter or 26% of seniors trust the Internet "a lot" or "some" to provide accurate health information, compared to 58% of 50-64 year-olds. A majority of seniors, 61%, are "very concerned" about potential invasion of privacy and the gathering of personal information in cyberspace.[14] In fact, 56% of people over the age of 65 say they never plan to go online, and more than one-half of individuals who believe they would not find the information they seek on the Internet are age 65 or older.[15] Although seniors are much more likely to have health problems and disabilities, they are less likely to use the Internet than their younger counter parts.[8]

Internet Programs: Preparing Seniors for Online Use

In the United States, a number of projects are available to train older adults to use computers and the Internet. Gustafson and colleagues[16] offered computer skills training to older women with breast cancer to provide online educational and social support. Several researchers have reported[17] the importance of providing both lecture classes and hands-on practice for participants.[16] A study by Cellar and colleagues[18] found that senior participation in Internet training and use promoted more positive attitudes towards aging and fostered a sense of social support and connectivity. In developing programs for older adults, Jones and Brennen discuss implications for designing computer skill instruction for older adults.[19] Kubeck, and colleagues[20] discovered that older adults tend to be less efficient on Internet search problems. Two recent studies present some of the major barriers to computer use among older adults[21, 22] including computer anxiety, short-term memory loss, decrease in manual dexterity, and loss of visual acuity. Timmerman describes two "model" instructional programs designed to train seniors in computer use: SeniorNet and Microsoft Community Technology Seminars.[22]

SeniorNet

The sample selected for the study reported here consisted of a group of older adults currently enrolled in SeniorNet. Nationally, SeniorNet has actively promoted the use of the Internet by older adults. SeniorNet is a not-for-profit voluntary community of computer-using adults, age 50 and older. SeniorNet's mission is to provide older adults education for and access to computer technologies, currently supporting over 240 Learning Centers throughout the U.S. and in other nations.[23] SeniorNet offers older adults an array of continuing education programs, including hands-on computer training. The non-credit courses offered through the SeniorNet Learning Centers are often in alliance with community-based organizations, including university or community college programs for older adults.

Electronic Health Information Resources for Seniors

The National Library of Medicine (NLM) is part of the National Institutes of Health and provides freely accessible consumer health information websites.[24] The NLM is the world's largest medical library, and offers access to biomedical literature through a variety of databases, located at this URL. The following NLM websites feature senior-related health information and were developed primarily for older adults.

- *MedlinePlus* (http://www.nlm.nih.gov/medlineplus). MEDLINEPlus is the NLM's consumer health database, providing authoritative, up-to- date information from the National Institutes of Health (NIH) and other trusted sources on over 600 diseases and conditions.
- *MedlinePlus NIHSenior Health site* This talking website, developed by the National Institute on Aging (NIA) and the NLM, makes senior-related health information easily accessible for adults 60 and older and for family members and friends who are seeking online health information for their older relatives. (http://nihseniorhealth.gov/about.html). Seniors can click on a paragraph and hear it read to them. NLM has provided the infrastructure to implement the site that is integrated with MEDLINEplus, but has specific features seniors need: talking web, large fonts, high con-

trast, and all within the seniors' control on the desktop, without any special software to download.

- *MedlinePlus Interactive Health Tutorials* The Interactive Tutorials include over 150 slide shows with sound and pictures in easy-to-understand language for the consumer.
- The National Institute on Aging, one of 27 Institutes and Centers of NIH, leads a broad scientific effort to research and understand the nature of aging and to extend the healthy, active years of life. The site is searchable by subject and can be found at http://www.nia.nih.gov . NIA also sponsors a consumer friendly site for older adults called, *NIH SeniorHealth*. The website is designed to make age related health information easily accessible for family members and friends seeking reliable, easy to understand online health information about common conditions associated with aging and related health resources (http://nihseniorhealth.gov).

Research Design and Methods

This cross-sectional, descriptive study was conducted at the SeniorNet Learning Center at University of South Florida (USF) in Tampa, FL, which is part of the state and national SeniorNet network. After gaining Institutional Review Board approval for the expedited study, informed consent was obtained by using participants' voluntary completion of the questionnaire.

Sample: The study participants were selected at convenience from the population of seniors who were beginning the "Introduction to Computers and the Internet" course at the local SeniorNet program affiliated with USF in Tampa. The researchers distributed 120 questionnaires to 12 groups of SeniorNet enrollees. A total of 108 questionnaires were returned. Of those, 103 were usable, resulting in an 86 % response rate.

Instrument: The 35 item questionnaire consists of the following sections designed to assess domains related to Internet use and preferences of the elderly (>65 years): **1)** past and current health seeking behaviors on the Internet and preferences and needs of older persons for health information resources and preferences on the Internet (16 items); **2)** a 10-item, summated rating scale to assess seniors' Self-Efficacy with Computers and Related E-Technology (SECRET), using a 7-item rating scale (0-Not at All to 6- A Great Deal); and, **3)** a demographic section is included in the last part of the questionnaire. The questionnaire is administered by self-report, and it takes 5-10 minutes to complete the instrument. The SECRET instrument was piloted for readability with 12 elderly volunteers from the USF community. Three experts in Aging Studies from USF tested content validity. The tool has a readability level of 8th grade, and the content validity index was assessed to be high ($r = .92$, $p = .01$).

Results

Profile of Sample Of the 108 questionnaires distributed to seniors who were newly enrolled in the SeniorNet program, 103 usable questionnaires were returned. The sample consisted of 60 females (59.4) and 41 males (40.6 percent). Mean age of the sample was 71.18 (sd 7.20), and the age range was 56 to 84. Ethnic and racial distribution of the sample was 86 percent white, African American 3 percent, Hispanic 1 percent, and Other 9 percent. Regarding educational level, 53% of the sample indicated a College-level degree or higher. Marital status was reported as 55 percent married; 10 percent divorced; 21 percent widowed; and the remaining were 19 were either single or had a live-in mate. The majority lived with a spouse or partner, 66.7 percent. The vast majority or 77 percent reported they were retired. Employment status was reported as full-time, 3.4 percent, 10.2 were full-time homemakers, 7 percent reported part-time work; and, 2.3 percent reported they were disabled and unable to work. Other demographic factors are shown in the **Table 1**. Of these 79 percent willing to report their annual income, 53 percent indicated total annual income exceeding $50,000. Of the sample, 37% indicated no health insurance other than Medicaid/Medicare. A Pearson bivariate correlation was done to examine whether there was an association between age and perceived difficulty using the computer. Results indicated no significant correlation ($r = .12$, $p = .26$) between age and difficulty using computers.

Assessment of the SECRET Rating Scale

Cronbach's alpha was used to assess the internal reliability of the ten items on the technology scale. Results indicated a high degree of internal consistency reliability, $r = .93$, ($p = .001$). In order to examine whether the scale was unidimensional, a principal

Table 1 Computer Access, Internet Access, Uses, and Preferences of Seniors

Item	Frequency	Percent
Computer Access at Home	95	92.2
Access to Internet	73	70.9
Type Access		
Cable or DSL	45	51.1
Phone or Modem	41	46.6
Freq of Computer Use		
Once a week	3	2.9
Several times a week	22	21.4
Daily	37	35.9
Several times a day	33	32.0
Years of Computer Experience		
< 1 year	17	16.5
1 to 5 years	11	10.6
2 to 5 years	28	27.2
5 to 10 years	18	17.5
> 10 years	27	26.2
Perceived Level of Understanding of PC and Internet		
Can turn on PC but usually have difficulty	6	5.8
Know the basics only	36	35.0
Understand software and can learn new software easily	40	38.8
Completely understand and are comfortable	15	14.6
Primary Purposes of Computer		
To Send e-mail	41	39.8
To Find Info on Internet (nonhealth)	16.5	16.5
To Find Info about health or medications	1.9	1.9
To check accounts or stocks	4.9	4.9
Other	22.3	22.3
Number of times a week you seek information about health on the internet.		
Never	40	38.8
< once a week	51.5	54.1
Daily	4	4.1
> once a day	1	1.0
Use of Websites or Browsers for access to health information		
None	39	39.8

Table 1 Computer Access, Internet Access, Uses, and Preferences of Seniors

Item	Frequency	Percent
Google	47	45.6
PubMed	1	1.5
Medline Plus	3	2.9
Other	13	12.6
Participated in Online Chat about Health Condition or Support Group		
No	89	93.7
Yes	6	6.3
If yes, was it helpful?		
Yes	4	36.7
Would like to see e-mail for physician or nurse questions.		
No	24	23.3
Yes	70	74.5
Would like to use e-mail for medication refills.		
No	19	18.4
Yes	76	73.8
Interested in e-health visits for chronic health conditions.		
No	50	48.5
Yes	39	37.9
Current Health Conditions of Seniors		
Hypertension	6	5.8
Heart Disease	2	1.9
Stroke	1	1.0
Cancer	1	1.0
Arthritis	9	8.7
Liver Disease	1	1.0
Chronic Lung Disease	1	1
Stomach Conditions	1	1
Other	39	37.9
Prefer Internet Programs to Help Seniors Cope with Chronic Conditions		
Yes	75	72.8
No	11	10.7
Prefer Internet Programs to Help Seniors Prevent Health Problems		
Diet	2	1.9
Exercise	5	4.9
Healthy Lifestyle	2	1.9

Table 1 Computer Access, Internet Access, Uses, and Preferences of Seniors

Item	Frequency	Percent
Preventive Health Measures	2	1.9
Stress Reduction	1	1.0
Saving on Medications	14	13.6
Other	4	3.9

components analysis was done with varimax rotation. As expected, results indicated that nine 9 explained 68 percent of the variance, and had high factor loadings (.60 or >) on one factor, indicating that the scale is unidimensional, and measures the one domain of self-efficacy and e-technology use.[25] Because of the unidimensionality, only one factor, self-efficacy, was extracted. Component plots were not produced.

Computer Access, Internet Access, Needs and Preferences As shown in **Table 1**, 51% of the sample had access to DSL or cable and 47% had phone-modem access. About 66% of respondents indicated they used the computer one or more times a day. Of the sample, 15% said they felt "completely comfortable" using the computer and the Internet. Only 6% knew how to turn a computer on, but did not know much more than that.

Perceived Self-Efficacy of Seniors with Computers and Related E- Technology

Table 2 depicts the mean scores and total scores of respondents on the self-efficacy rating scale. A two-tailed, independent t-test was performed to examine scores by gender on the ten-item SECRET scale. Key differences were found between men and women in their responses to Items 1, 6, and 8 that pertain to learning how to use and/or manage new devices and software and significant differences by total score. A lower score on the scale, indicates a higher degree of perceived self-efficacy with computer-related technology. Overall, males scored significantly lower on the SECRET than women, indicating that men have a higher degree of perceived self-efficacy with computer software and technology. The distribution of mean total scores on the scale is shown in **Figure 1**. Individual item scores are presented in **Table 3**.

Figure 1.
Examination of Score Distribution of the Self-Efficacy Scale by Gender

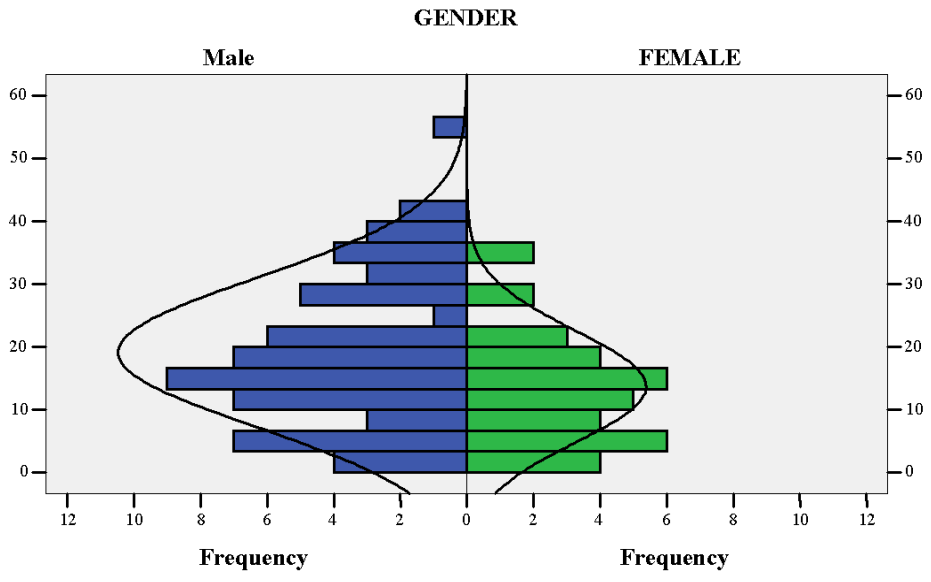

Table 2 Type Health Insurance and Estimated Annual Income (N =89

Variable	Frequency	Percent
Type Health Insurance		
Medicare Only	1	1.0
Medicaid Only	1	1.0
Medicare and Medicaid	16	15.8
Private Health Insurance	35	34.7
Medicare & Private Health Ins.	21	20.8
None at all	34	33.7
Estimated Annual Income		
Under $10,000	1	1.0
$10 to 24,999	5	5.0
$25 to $49,999	31	30.9
$50 to $99,999	32	31.7
> $100,000	10	9.9
Living Arrangements		
Alone	28	27.9
Live with spouse or partner	64	62.8

Table 3 Descriptive Results: Mean Scores on the SSECRT and Independent T-Tests Comparing Scores by Gender

Scale Items[a] (0- None to 6- A Great Deal	Mean	SD	t	Sig-2 tailed	Mean Diff	SE Diff	95% LCL	95% UCL
1. I feel nervous using new technical or electronic devices	1.96	1.77	2.87	.01	1.02	.35	.31	1.73
2. I find modern, complex devices hard to understand.	2.31	1.53	2.17	.03	.72	.33	.06	1.38
3. I find new devices difficult to learn to use.	2.50	1.64	2.46	.01	.87	.35	.16	1.58
4. I am fearful of using electronic technology.	1.44	1.56	3.70	.00	1.10	.29	.51	1.69
5. I feel nervous when using electronic devices such as a computer	1.20	1.53	1.93	.05	.61	.31	-.01	1.24
6. I am frustrated by new electronic devices	2.07	1.71	2.34	.02	.90	.38	.13	1.68
7. I don't like new electronic devices because I dont understand them	1.34	1.60	1.43	.15	.54	.37	-.21	1.29
8. I wish computers had never been invented	0.24	0.82	2.28	.02	.32	.14	.04	.60
9. I dislike having to learn new computer software	1.26	1.52	.28	.77	.10	.34	-.59	.79
10. I find computers difficult to use	1.55	1.69	1.72	.09	.59	.34	-.09	1.29
Total Scale Score	17.48	11.38						
Females	19.13	11.81	2.58	.01	5.43	2.63	.93	9.94
Males	13.69	8.90						

a: Scores may range from 0 to 60. The lower the score the higher is the degree of perceived self-efficacy with computer-related e- technology.

Discussion, Conclusions, and Recommendations

Although this study was limited in that the sample of seniors enrolled in the SeniorNet program is not representative of the general population of seniors within the United States because of their higher educational level than the US average, the results may be helpful in designing future programs for seniors. First, the SECRET tool appears to be a valid and reliable tool for assessing perceived self-efficacy of older adults and their abilities to use the Internet and e-technology. Men indicated a higher degree of self-efficacy in learning new software programs and new e-technologies. The implication of this finding suggests that people who provide Internet and software classes for older adults may need to assess the special needs of older women, and be sensitive to their lack of confidence in learning new technologies and software. It suggests that computer classes may need to be designed according to gender. Women may feel more comfortable with classes designed especially for women, separating groups by gender.

Results of this assessment of seniors' uses, needs, and preferences for Internet based health information and health services indicate some interesting trends and are consistent with findings of previous studies.[2, 26, 27] Use of the Internet by people 50 to 64 is currently about twice the rate of older adults, 65 years and more.

While younger and older groups of seniors view the Internet as a valuable tool in finding health information of importance to them in managing their health conditions, most indicated they value the potential of online e-health care and welcome the opportunity to participate in online e-health-care visits. While the digital divide between these two older groups may be beginning to narrow some, it is clear from reviewing other studies that e-health resources have increased in number and quality, prompted by innovations in technology and changes in reimbursement policies for e-health and telehealth home care. Organizations such as the American Association of Retired Persons, the public media, and healthcare institutions should promote the use of valid and legitimate web portals designed for seniors, such as those offered by the National Institutes of Health. Lower-income seniors who have no Internet service at home may use public libraries and take advantage of basic Internet training available to them. Academic health science libraries and health associations provide access to quality health care databases. Health science librarians are trained to provide assistance for locating quality health information, as well as search techniques. Having public kiosks readily available for seniors to use while they wait in hospital lobbies, physicians' offices, and other healthcare facilities would promote the use of pre-designed health-web portals for seniors such as those from NLM, NCI, and other valid sources. During the last five years, there has been a phenomenal growth in the number of Internet-based programs for the management of chronic illness in elderly populations, including diabetes, congestive heart failure, COPD, HIV, Alzheimer's, and many more. Gerontologists and healthcare professionals in the field of aging can now gain access to the innovative e-health portals and technologies to help seniors better manage the aging process. The provision of customized, online clinical options for navigating the maze of healthcare resources and services can aid elderly consumers to improve their health and quality of life. E-technologies have the potential to help seniors prevent or mitigate the onset of age-related conditions and to manage chronic conditions and symptoms. A number of e-health researchers have reported the immediate cost and other related benefits from using web portals in clinical research and in health promotion and risk-reduction programs among seniors.[28-31]

As baby-boomers age, the demand for more Internet-based healthcare services should increase markedly. As healthcare moves toward digitized health records in all facets of care, there must be more options available in the form of patient-customized portals for specific chronic illnesses and related issues for patients and caregivers. These e-health portals should meet three essential requirements: **1)** be interoperable and interface with the patient's entire electronic health record; **2)** be designed to help the senior track treatment compliance and responses to drugs and other therapies; and, be designed to engage the patient in the decision-making process related to their own health choices, so that they join in a partnership with their healthcare providers.[32] A grow-

ing concern is the distribution of "e-health care" to all seniors, especially those in under-served areas.[2] As Internet and computer costs become more affordable, providing "e-health resources" in the home can be expanded to all seniors, not just the well-to-do elderly.

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Address reprints to:

Linda E. Moody, PhD, MPH, FAAN, BC
Distinguished Professor, Hughes Endowed Chair, Nursing Informatics
College of Nursing, MDC 22
University of South Florida
Tampa, FL 33612

E-mail: lmoody@hsc.usf.edu