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Communication Inequalities and Public Health Implications of Adult Social Networking Site Use in the United States

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Abstract

Background—Social media, and specifically social networking sites (SNS), are emerging as an important platform for communication and health information exchange. Yet, despite the increase in popularity and use, only a limited number of empirical studies document which segments of the adult population are and are not using social networking sites and with what, if any, affect on health.

Methods—The purpose of this study is to identify potential communication inequalities in social networking site use among a representative sample of US adults and to examine the association between SNS-use and psychological well-being. We analyzed data from the National Cancer Institute's 2007 Health Information National Trends Survey (HINTS).

Results—Thirty-five percent of online adults reported SNS-use within the past 12 months, and; there were no significant differences in SNS-use by race/ethnicity or socio-economic position. Younger age ($p=.00$) was the most significant predictor of SNS-use while being married ($p=.02$) and having a history of cancer ($p=.02$) were associated with a decreased odds of SNS-use. Social networking site use was significantly associated with a 0.80 ($p=.00$) increment in psychological distress score after controlling for other factors.

Conclusion—The absence of inequalities in adult SNS-use across race/ethnicity and class offers some support for the continued use of social media to promote public health efforts; however, issues such as the persisting Digital Divide and potential deleterious effects of SNS-use on psychological well-being need to be addressed.

Background

The Digital Divide, or gaps in access to Internet between social groups, has narrowed over the past decade as overall penetration of the Internet within American homes has increased from 40% in 2000 to nearly 75% in 2009 (Pew, 2009). With narrowing differences in access, attention has shifted to examining the *Second-level Digital Divide* or the *Usage Gap*—differences in how social and racial/ethnic groups make use of the Internet (Hargittai & Hinnant, 2008; van Dijk & Hacker, 2003; Zillien & Hargittai, 2009). The definition of “use” is vague but it is reasonable to assume that it may refer to various features of the Internet including social media whose popularity has drawn considerable attention in the past two years, with particular attention to the use of social networking sites (SNS) (e.g. MySpace, Facebook and Twitter) (Boyd & Ellison, 2007; Madhavan, 2007). The Pew Internet & American Life Project report that 65% of US teens and 47% of online adults visited a social

networking site in 2009 up from 37% in 2008 and only 8% in 2005 (Lenhart, Purcell, Smith, & Zickuhr, 2010).

In response to the growing popularity of this new communication platform, social networking sites have not only become leading channels for political and business matters but for health-related affairs as well (Fox & Jones, 2009; Gillin, 2007; Smith, 2009; Stone & Cohen, 2009; Waters, Burnett, Lamm, & Lucas, 2009). Taking the lead from marketing strategies implemented by sectors such as the tobacco and beverage industries (Levere, 2010; McWilliams, 2010), public health communication practitioners have utilized SNS for a number of health education, intervention and social marketing efforts (Hawn, 2009; Kaiser Family Foundation & MTV, 2009; Vance, Howe, & Dellavalle, 2009). There has been such a substantial migration to social media and social networking sites for public health campaigns that recently the CDC deemed it necessary to issue guidelines for best practices (The Centers for Disease Control and Prevention, 2010).

Though there has been a push from the public health sector to mirror industry-driven social media marketing techniques for health promotion/disease prevention efforts, the field currently lacks empirical evidence on the effectiveness of these strategies. Speculation of potential health effects has dotted the popular press media landscape over recent months with headlines ranging from “How using Facebook could raise your risk of cancer” and “Is social networking killing you?” to “Facebook is good for you” (Clifford, 2009; Mackey, 2009; Marshall, 2009; Miller, 2010; n.a., 2009). Yet, despite this contested dialogue, there are only a limited number of empirical studies that rigorously document which segments of the adult population are and are not using social networking sites and with what, if any, affect on health (Chou, Hunt, Beckjord, Moser, & Hesse, 2009; Fox & Jones, 2009). Such analysis is essential for public health practitioners and educators in effort to document any communication inequalities defined as differences among social groups in accessing, seeking, processing and using health information, which may persist in this new media environment (Viswanath, 2006). The Structural Influence Model of Communication (SIM), which identifies the role of communication in linking social determinants with health outcomes, suggests that any differences among social and racial/ethnic groups in use of communication channels, such as social networking sites, could result in both an indirect and direct effect on health, ultimately leading to an exacerbation of existing health disparities among vulnerable groups (Ackerson & Viswanath, 2009; Viswanath & Kreuter, 2007) (Figure 1).

Researchers have also documented that in addition to targeted health communication efforts from the public health community, there is the potential for incidental health information exposure through online communication between “friends” on social networking sites (Fox & Jones, 2009; Sarasohn-Kahn, 2008; Scansfeld, Scansfeld, & Larson, 2010). There is a growing number of adult SNS-users who report sharing and receiving health information from friends within their online social networks (Fox & Jones, 2009). In fact, during the recent global H1N1 (“swine flu”) pandemic, some have estimated that up to 10,000 H1N1-related tweets were being sent per hour among Twitter users (Mashable, 2009). The accuracy and quality of this information exchange has yet to be extensively examined; however, a recent analysis of Twitter status updates involving the use of “antibiotics” reported that more accurate information, as compared to misinformation, was tweeted among users (Scansfeld, et al., 2010). The addition of yet another communication platform to disseminate and share health information provokes some urgent questions. Who will benefit from the introduction of this new platform or channel for disseminating health information? Is it likely that non-users of this channel will be subject to a substantial information disadvantage? Specifically, if SNS-use is racially and socially patterned similar to Internet access in the US, these communication inequalities could aid in widening health-related

knowledge gaps among members of lower-socioeconomic position (SEP) and racial/ethnic minority groups ultimately having a negative impact on their health (Emily Z Kontos, Emmons, Puleo, & Viswanath, in press; Tichenor, Donohue, & Olien, 1970; Viswanath, 2006; Viswanath & Kreuter, 2007).

In addition to the indirect effects stemming from SNS use, there is the potential for direct health effects among SNS-users. Mounting evidence suggests that SNS-use has a beneficial impact on both social capital and psychological well-being. This literature is based on the notion that communication, both in terms of media use and interpersonal exchange, plays a vital role in integrating people into their communities by helping to build support, maintain ties and promote trust. Social ties, in turn, are associated with the acquisition of health information (Ackerson & Viswanath, 2009; Viswanath, 2008). Studies drawing on both cross-sectional and longitudinal data show that social networking sites offer teens, college students and adults the opportunity to build bridging social capital (Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008; Valenzuela, Park, & Kee, 2009). Bridging social capital refers to the building of connections between heterogeneous groups; these connections are likely to be more fragile but are also more likely to foster social inclusion and new information exchange in comparison to stronger more homogenous connections resulting from bonding social capital (Schuller, Baron, & Field, 2000). SNS-users exhibit higher levels of bridging social capital as evidenced by the increased number of ties as well as the heterogeneity of ties within their network (Hampton, Sessions, Her, & Rainie, 2009). Research shows that SNS-users also engage with people within their networks (both offline and online) more frequently than non-SNS users (Hampton, et al., 2009). Additionally, younger SNS-users, compared to their non-user counterparts, exhibit higher levels of civic engagement and social trust, two influential contributors to social capital (Ellison, et al., 2007; Steinfield, et al., 2008; Valenzuela, et al., 2009).

Though there has been no examination of the impact of SNS-related social capital on physical health outcomes such as cardiovascular disease-as is well documented in “offline” social capital studies (Kawachi, Kennedy, & Glass, 1999; Rutledge, et al., 2004), there is a growing literature illustrating the beneficial influence of SNS-related social capital on mental health and psychological outcomes. Studies with teens and college students have demonstrated that improved social capital among SNS-users is positively associated with psychological outcomes such as psychological well-being, self-esteem and life satisfaction (Valkenburg & Peter, 2007, 2009; Valkenburg, Peter, & Schouten, 2006). Yet, in spite of the emerging body of evidence of the beneficial impact of SNS-use among younger users, there has been no examination of the association among adults. Such an examination is crucial given that adult SNS-use will only grow over time similar to other new technologies and media platforms such as television and cell phone use (Rainie, 2010). With this increase in adult SNS-use, we can expect an even larger migration from traditional media/communication channels than what has already been witnessed in the past couple of years (Van De Belt, Engeleni, Berbent, & Schoonhoven, 2010). This transition has been approached with optimism; however, there is very limited empirical data documenting the impact of this change on those groups that are most vulnerable. As public health social media efforts move forward, it will be important to critically examine such efforts to avoid any potential missteps that may exacerbate existing health disparities.

Objective

The purpose of this study is to offer an examination of the relationship between SNS-use on both health communication and psychological well-being among a representative US adult population. Our first aim is to identify potential disparities in adult social networking site use by race/ethnicity and socio-economic position to determine if there are communication inequalities in this segment of the social media environment. The second aim of the study is

to examine the association between SNS-use and psychological well-being to determine if the beneficial impact of SNS-use observed among teens holds true among an adult population.

Methods

Data Source

The data for this study were drawn from the National Cancer Institute's 2007 Health Information National Trends Survey (HINTS). HINTS is focused on reporting the cancer communication behaviors and trends of American adults based on a survey of nationally representative, non-institutionalized adults and has been fielded every 2-3 years beginning in 2003. The latest wave of data was collected from January 2008 through May 2008 using two sample frames (random digit dial (RDD) phone survey and mail). The dual frame was chosen based on research by Link and colleagues (Link, Battaglia, Frankel, Osborn, & Mokdad, 2008) which suggests that use of a mail survey, with appropriate follow-up, can achieve a higher response rate than RDD alone. This design was also adopted by the CDC's Behavioral Risk Factor Surveillance Survey (BRFSS). The RDD sample was conducted using a Computer Assisted Telephone Interview (CATI) format. Data were collected from 4,092 respondents via CATI. The second national random sample was selected from a list of addresses from the United States Postal Service (USPS) administrative records. Because of the tendency for mail respondents to represent non-minority groups and have characteristics associated with higher socioeconomic status (Hauser, 2005), the mail survey included a stratified sample selected from a list of addresses that oversampled for minorities. Data were collected from 3,582 respondents via mail. The response rates for HINTS 2007 was 31% for the mail sample and 24% for the RDD sample (Cantor, et al., 2009).

Measures

Internet access and social networking site use—Though the focus of this study is social networking site use, it is also necessary to assess access to the Internet since racial/ethnic and social patterning of both access and use could have a compound effect on communication inequalities and health (E. Z. Kontos, Bennett, & Viswanath, 2007). Internet access was measured by the question: "Do you ever go on-line to access the Internet or World Wide Web, or to send and receive email?". Those responding "yes" to this question were classified as having access and being a general Internet user. Social networking site use (SNS-use) was measured among those respondents who reported Internet access by the question: "In the past 12 months have you done the following while using the Internet... Visited a social networking site, such as "MySpace" or Second Life?". Again, those responding "yes" to this question were classified as being a social networking site user (SNS-user).

Psychological distress—The direct health impact of social networking site use was measured using a psychological distress score, as has been done in studies (Valkenburg & Peter, 2007, 2009). Psychological distress was measured as a continuous variable as the sum score of a six-item assessment of depressive and anxiety symptoms based on the Adult Core Questionnaire of the 1997 National Health Interview Survey (Cantor, et al., 2009). Respondents were asked how often in the past 30 days that they felt: so sad that nothing could cheer them up, nervous, restless or fidgety, hopeless, worthless and that everything was an effort. The response categories were: all of the time, most of the time, some of the time, a little of the time, none of the time and don't know. Scores ranged from 0-36 with 36 indicating extreme level of distress.

Socio-demographic characteristics—To determine potential disparities in Internet access and social networking site use the following socio-demographic characteristics were included in our analyses: age (18-34; 35-49; 50-64; 65-74; 75+), sex (male; female), household income (less than \$20k; \$20-34k; \$35-49k; \$50-74k; \$75k+), education (less than high school; high school; some college; college or more), employment status (employed; unemployed; homemaker; student; retired; disabled), race/ethnicity (non-Hispanic white; non-Hispanic black; Hispanic; other including Asian, Native American, Pacifica Islander and multi-racial) having children (at least one minor child living at home; no minor children living at home), and marital status (married; not married). We also assessed differences in access of the Internet and SNS-use by cancer history (ever; never), health status (good, very good or excellent; fair or poor), immigrant status (born in US; not born in US), health insurance status (insured; uninsured) and having a regular physician (has seen a doctor in a non-ER setting within the past year; has not seen a doctor in a non-ER setting within the past year) since disparities across these variables would additionally impact health outcomes.

Analysis

Sample and sub-population analyses—We analyzed data from both the mail and RDD survey frames and conducted two analyses for each research question. The first set of analyses included the entire eligible survey population. The second set of analyses were sub-population analyses that were limited to adults who reported no minor children living at home ($n=3,031$). Sub-population analyses were performed because the HINTS SNS measure may have limited validity in capturing SNS-use since it did not specifically ask, as in other studies, about building a personal profile or other characteristics of use (Ellison, et al., 2007; Hampton, et al., 2009; Steinfield, et al., 2008; Valkenburg & Peter, 2007, 2009; Valkenburg, et al., 2006). Our choice of sub-population analyses eliminates the inclusion of parents who may have responded “yes” to visiting a social networking site to oversee their child’s use but not considered themselves an actual user.

Observations with missing data for any of the key variables were excluded from analysis, except for observations with missing income data. Because there were a substantial number of observations with missing income data ($n=500$) a separate category for these respondents was created and included in all analyses and labeled “Didn’t report”. Analyses were conducted using STATA v.11 to properly calculate standard errors to accommodate the multistage sampling design as well as the sub-population analyses. We re-estimated the sampling weights as recommended by NCI and included survey frame/mode as a covariate in each regression model to account for mode effects. Detailed descriptions of how the sample and replicate weights were calculated can be found in the HINTS 2007 Final Report (Cantor, et al., 2009).

Communication inequalities and social networking site use—To examine the first research question of identifying potential communication inequalities in Internet access and adult social networking site use by socio-demographic characteristics such as race/ethnicity and socio-economic position, we first estimated unadjusted chi-square associations. We then re-estimated these associations using multivariable logistic regression to determine the independent association for each socio-demographic variable of interest while adjusting for other variables.

Social networking site use and psychological well-being—To examine the second research question of the relationship between adult social networking site use and psychological distress we first performed diagnostic procedures on our continuous outcome variable, psychological distress score, to ensure that the assumptions of ordinary least squares (OLS) regression were met- specifically normality, homoscedasticity and linearity.

Since these assumptions were met, we then estimated the adjusted association between SNS-use and distress score using multivariable OLS linear regression techniques to control for spurious relationships by including all covariates from the previous models.

Finally, we conducted a specificity analysis to determine if the association between SNS-use and psychological distress was specific to SNS-use or was also transferable to general Internet use, since there is a substantial body of research that has studied the association between general Internet use and psychological outcomes (Bessiere, Pressman, Kiesler, & Kraut, 2010; Kraut, et al., 2002; Kraut, et al., 1998). To conduct our specificity analysis we examined the relationship between Internet access/general use and psychological distress score, again controlling for the same covariates identified in the previous model.

Results

Internet access: the Digital Divide

Similar to other national-level prevalence estimates (Rainie, 2010), our analyses indicate that 70% of HINTS respondents reported Internet access while 34% report having visited a social networking site within the past 12 months. Though the overall penetration of Internet access is high, there are significant disparities across racial/ethnic and social groups (Table 1). Half of Hispanics and 40% of non-Hispanic Blacks lack Internet access, and even after controlling for other important variables, Non-Hispanic blacks and Hispanics have approximately half the odds of accessing the Internet from any location compared to their non-Hispanic white counterparts. Only 28% of adults without a high school diploma report Internet access, compared to 91% of those with a college degree. This disparity remains after controlling for socio-demographic characteristics, with college graduates having more than 14 times the odds of accessing the Internet compared to those without a high school diploma. Similarly, 91% of adults with a household income of \$75,000 or greater have Internet access, while only 45% of those earning less than \$20,000 report access. Regression results indicate that these higher-income individuals have nearly 5 times the odds of accessing the Internet compared to their lower-income counterparts.

Besides differences across SEP and race/ethnicity there is also a decreased odds of Internet access among older adults. Less than half of US adults over 65 years report accessing the Internet on at least an occasional basis and this percentage drops to a quarter when adults reach the age of 75. Even adults between the ages of 34 and 49 have half the odds of Internet access compared to their younger counterparts aged 18 to 34 years after controlling for important factors such as income, education and employment. We also see a decreased odds of Internet access among males and those adults who are not married, don't have a regular physician, are in fair/poor health, were not born in the US and completed the telephone survey (Table 1).

Communication inequalities and adult social networking site use

Despite inequalities in Internet access, there are no significant differences in SNS-use across racial/ethnic and social groups in multivariable analyses. In fact, bivariate analyses indicate a reverse trend in SNS-use compared to general Internet access, with higher frequencies of use seen among those with lower education and income levels as well as among racial/ethnic minorities. Over 40% of those earning less than \$20,000 and 48% of those without a high school diploma report SNS-use, compared to only 30% of those earning more than \$75,000 and having a college degree. Similarly, we see increased use among Hispanics (41%) and non-Hispanic blacks (43%) compared to non-Hispanic whites (31%). However, these differences do not persist in the multivariable analyses, most likely due to the significant influence of age on SNS-use (Table 2).

Younger age is the most significant determinant of SNS-use among adults, with use decreasing as age increases. Over 60% of those aged 18-34 years use SNS compared to only 27% of those 35-49 years and 12% of those 50-64 years. These differences are consistent in multivariable models with individuals aged 35-49 years having a 75% lower odds of SNS-use compared to those 18-34 years (Table 2). Being unmarried and having no history of cancer are the only other demographic characteristics significantly associated with SNS-use in multivariable analyses. Married adults have a 35% lower odds of SNS-use compared to single adults, and individuals with a history of cancer have a 43% lower odds of SNS-use compared to individuals with no personal history of cancer.

Of note, there are no significant differences between the multivariable results based on the entire sample of Internet users compared to the results based on the sub-population of adult Internet users with no minor children living at home (Tables 2). This offers evidence for the validity of the single-item measure of SNS-use and the subsequent results derived from the entire sample population.

SNS-use and psychological well-being

Fully adjusted linear regression models show that social networking site use is significantly associated with nearly a one point increase (0.80 $p=.00$) in psychological distress score among adults after controlling for age, income, education, race/ethnicity, immigrant status, employment, sex, marital status, children, history of cancer, health status, health insurance, having a regular physician and survey mode (Table 3). Among the sub-sample of adults reporting no children at home, the observed association is smaller yet still significant, with SNS-use associated with a 0.72 ($p=.03$) increment in psychological distress score. Additionally, results of the specificity analysis indicate that general Internet use is not associated with psychological distress score, and thus the observed association of SNS-use on increased distress score is not explained by general Internet use.

Discussion

Significant disparities in Internet access persist across racial/ethnic and social groups. However, once access is gained, there is consistent use of social networking sites regardless of many socio-demographic characteristics. Age is the primary driving factor of SNS-use with younger adults, representing the “online generations”, reporting more use than older adults. Subsequently, the observed unadjusted differences in SNS-use by education and income diminish in our multivariate models once the effects of age are controlled for. The absence of inequalities in SNS-use across race/ethnicity and class offers some support for the continued use of social media to promote public health interventions and messages especially in light of the increased marketing efforts in these venues by tobacco and food industries (Levere, 2010; McWilliams, 2010).

Although there is no evidence of racial/ethnic and social patterning of social networking site use, SNS may not be the most appropriate communication channel for all public health messages. For example, our data show that adults with a history of cancer have a 43% lower odds of using SNS compared to adults with no history of the disease even after controlling for influential factors such as age and health status. These results indicate that general social networking sites, such as those reflected in the single-item measure (i.e. MySpace), may not yet be optimal for cancer-specific outreach and support among patients and survivors and existing efforts should be evaluated for their reach and effectiveness. Yet, further examination is needed to understand the influence of patient-centered networking sites such as PatientsLikeMe and CarePages within the cancer community. Some research has shown that family members are more likely to report SNS-use and therefore they may be more suitable communication targets for SNS-based campaigns (Chou, et al., 2009). Additionally,

even though differences in SNS-use do not persist once Internet access is gained, there are still substantial disparities in access that may maintain communication inequalities.

Our data provide evidence that the issue of Internet access still needs considerable attention when developing Internet-based public health interventions and communications. Emerging research indicates that the recent increase of short message service (SMS) mobile texting capabilities and mobile Internet technologies such as web-enabled cell phones and smartphones offer potential successful solutions to bridge the Digital Divide (Fjeldsoe, Marshall, & Miller, 2009). However, the effectiveness of these advancements outside of controlled intervention settings on communication inequalities and subsequent health-related knowledge gaps are yet to be realized given their recency and prohibitive cost. For example, data from the Pew Internet & American Life Project indicate that currently only 35% of cell phone users have accessed the web via their phone and those with higher incomes and education are more likely to have done so (Rainie, 2010). And while overall cell phone penetration is high with over 80% of adults reporting use, interruption and disruption of service among lower-SEP groups cannot be overlooked by public health practitioners and communication planners (Rainie, 2010).

The ubiquity of SNS-use, among those that have access to the Internet, may have a beneficial impact on health by minimizing communication inequalities and subsequent health-related knowledge gaps among users. However, our analyses also indicate that SNS use is negatively associated with higher levels of psychological distress among users. As stated earlier, there is a growing body of literature documenting the beneficial psychological impact of online social networking site use, through increased bridging social capital and decreased social isolation, among youth both in the US and abroad. Our results offer contrary evidence to these data reported among teens and college students (Ellison, et al., 2007; Steinfield, et al., 2008). Due to the cross-sectional nature of the HINTS data, it is difficult to speak to the directionality of the relationship. We cannot say whether those with higher distress are more likely to use SNS, or that online relationships lead to greater distress. In fact, there could be a negative impact of SNS-use among adults supporting the claims in the popular press that adults displace their time and offline relationships with online social networking pursuits (Mackey, 2009; n.a., 2009). This “displacement” hypothesis is based on the work of Robert Putnam who claims that increased use of new media technologies result in the privatization of leisure time that ultimately decreases participation in society and trust in others (Putnam, 1995, 2000). Additional research by Shah et al on the relationship between social capital and uses of the Internet among adults, suggests that while informational uses of the Internet may potentially enhance social capital, recreational uses may deter social capital that in turn could negatively affect one’s psychological well-being (Shah, Kwak, & Holbert, 2001; Shah, McLeod, & Yoon, 2001). What is unclear is if use of SNS, which in some ways combines recreational and information use, affects the association between social capital, health and well-being.

Our results on the association between SNS-use and distress mirror early studies on general Internet use among adults (Kraut, et al., 1998). Early adult adopters of the Internet were more likely to exhibit higher levels of anxiety and depression compared to non-users. A common explanation for early adopters preference for computer-mediated communication was that they were unsuccessful at attempts of “offline” communication and interpersonal relationships due to social anxiety issues (Campbell, Cumming, & Hughes, 2006). However as Internet penetration has increased across society, these associations no longer persist as evidenced by several longitudinal studies and our own specificity analysis indicating a beneficial, though not significant, impact of general Internet use on distress scores (Bessiere, et al., 2010; Kraut, et al., 2002). While it is possible that the mediation of personal relationships through social networking sites could increase psychological distress via the

mechanism of decreased social capital, our analysis may simply reflect the characteristics of adult early adopters of SNS. The association between use and psychological distress may dissipate over time with increased penetration to the larger adult population.

There are some limitations to our study. First, the low survey response rates may increase sampling error in our estimates; however, overall sampling coverage was enhanced through the dual survey frame design, which included cell phone only households as well as an over-sampling of minorities. Additionally, we were not able to account for frequency of use both for general Internet use or for social networking site use. It could be argued that social networking site users are heavier users of the Internet, in general, and the observed relationship between SNS-use and psychological distress could be a product of frequency of overall use rather than specific SNS-use since heavy use of the Internet has been shown to have a deleterious impact on psychological well-being (Katz, Rice, & Aspden, 2001). We believe that our specificity analysis illustrating the unique relationship between SNS-use and psychological distress minimizes this alternative explanation but further research supported with longitudinal evidence is warranted to better understand the underlying relationship between this emergent area of social media and its impact on health.

As social media and specifically social networking sites continue to attract adult users across all segments of the US population, it will become increasingly important for public health experts to rigorously monitor any emerging communication inequalities, evaluate how best to leverage social media for health promotion and disease prevention initiatives, and ultimately assess their impact on health outcomes. With these goals emerges a real need for refined measurement that adequately reflects the innate dynamism of this new platform and a nuanced understanding of the links between computer/technology mediated communication and health. Some factors that need consideration and subsequent metrics are an assessment of who is using social media (from social groups to marketers), type of health information that is being shared (from accurate to inaccurate), frequency and place of use (from mobile device to desktop computer), and their relation to both proximal and distal health outcomes. Our analysis serves as a foundation for future research and highlights the importance of this emerging field.

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Figure 1.

Table 1

Sociodemographic characteristics of Internet users

	Bivariate analyses		Multivariable analyses	
	Total survey population (n=6,738)		Total survey population (n=6,738)	
	% Internet user	χ^2 p value	OR [95% CI]	Adjusted Wald p value
TOTAL	70			
Age				
18-34	82	<.0001	1.00	<.0001
35-49	79		0.49 [0.35; 0.70]	
50-64	70		0.24 [0.17; 0.35]	
65-74	48		0.10 [0.06; 0.16]	
75+	24		0.07 [0.02; 0.06]	
HH income				
<20k	45	<.0001	1.00	<.0001
20-34k	54		1.40 [0.98; 1.99]	
35-49k	73		2.57 [1.77; 4.02]	
50-74k	81		3.43 [2.31; 5.09]	
>75k	91		4.83 [3.25; 7.19]	
Didn't report	62		1.93 [1.30; 2.89]	
Education				
<HS	28	<.0001	1.00	<.0001
HS	58		2.13 [1.56; 2.90]	
Some college	81		5.75 [4.23; 7.80]	
≥College	91		14.33 [9.85; 20.85]	
Race/ethnicity				
White, non-Hispanic	76	<.0001	1.00	<.0001
Black, non-Hispanic	59		0.52 [0.34; 0.80]	
Hispanic	50		0.47 [0.30; 0.73]	
Other	70		0.61 [0.41; 0.91]	
Immigrant Status		<.0001		0.00
Born in US	89		1.00	
Born outside US	11		0.50 [0.32; 0.79]	
Employment		<.0001		0.06
Employed	78		1.00	
Unemployed	61		0.94 [0.61; 1.47]	
Homemaker	64		0.67 [0.43; 1.03]	
Student	92		1.30 [0.55; 3.04]	
Retired	45		0.90 [0.64; 1.27]	
Disabled	40		0.67 [0.43; 1.05]	
Sex		0.00		<.0001

	Bivariate analyses		Multivariable analyses	
	Total survey population (n=6,738)	χ^2 p value	Total survey population (n=6,738)	Adjusted Wald p value
	% Internet user		OR [95% CI]	
Male	33		1.00	
Female	37		1.77 [1.41; 2.22]	
Regular Physician		0.00		0.00
No	20		1.00	
Yes	50		1.58 [1.23; 2.03]	
Marital Status		0.00		0.03
Not Married	67		1.00	
Married	73		1.25 [1.02; 1.53]	
Children <18yrs.		<.0001		0.45
None	66		1.00	
1+	77		1.11 [0.85; 1.46]	
Cancer History		<.0001		0.58
Never	71		1.00	
Ever	59		1.08 [0.83; 1.39]	
Health Status		<.0001		0.02
Fair, Poor	8		1.00	
Good, VG, Excellent	62		1.34 [1.01, 1.77]	
Insurance status		<.0001		0.07
Uninsured	10		1.00	
Insured	61		1.05 [0.74; 1.48]	
Survey Mode		<.0001		0.00
Address	41		1.00	
RDD	30		0.70 [0.56; 0.87]	

Table 2

Socio-demographic characteristics of Social-Networking Site (SNS) Users

	Bivariate analyses			Multivariable analyses		
	SNS-user (n=1,112) %	χ^2 p value	Entire sample of Internet users (n= 4,627) OR [95% CI]	Adjusted Wald p values	Subpopulation of adult Internet users with no minor children (n= 3,031) OR [95% CI]	Adjusted Wald p values
TOTAL	34					
Age		<.0001		0.00		0.00
18-34	62		1.00		1.00	
35-49	27		0.31 [0.23, 0.40]		0.25 [0.16, 0.38]	
50-64	12		0.13 [0.09, 0.18]		0.09 [0.06, 0.14]	
65-74	6		0.08 [0.04, 0.15]		0.06 [0.03, 0.11]	
75+	4		0.06 [0.02, 0.17]		0.04 [0.01, 0.13]	
HH income		0.00		0.78		0.46
<20k	43		1.00		1.00	
20-34k	38		1.14 [0.66, 1.95]		1.67 [0.83, 3.34]	
35-49k	39		1.39 [0.83, 2.31]		1.59 [0.84, 3.01]	
50-74k	35		1.41 [0.82, 2.42]		1.11 [0.59, 2.09]	
>75k	30		1.35 [0.83, 2.18]		1.44 [0.83, 2.49]	
Didn't report	29		1.37 [0.79, 2.38]		1.48 [0.68, 3.21]	
Education		0.00		0.70		0.94
<HS	48		1.00		1.00	
HS	36		1.37 [0.70, 2.69]		0.99 [0.38, 2.61]	
Some college	35		1.19 [0.61, 2.29]		1.12 [0.40, 3.15]	
≥College	30		1.28 [0.68, 2.40]		1.13 [0.41, 3.08]	
Race/ethnicity		0.00		0.61		0.71
NH-white	31		1.00		1.00	
NH-black	43		1.28 [0.87, 1.88]		1.12 [0.51, 2.25]	
Hispanic	41		0.99 [0.63, 1.58]		0.61 [0.25, 1.52]	

	Bivariate analyses			Multivariable analyses		
	SNS-user (n=1,112) %	χ^2 p value	Entire sample of Internet users OR [95% CI]	Subpopulation of adult Internet users with no minor children OR [95% CI]	Adjusted Wald p values	Adjusted Wald p values
Other	42		1.13 [0.69, 1.85]	0.91 [0.41, 2.01]		
Immigrant Status		0.43			0.76	0.84
Born in US	30		1.00	1.00		
Born outside US	4		0.93 [0.59; 1.46]	1.09 [0.47; 2.54]		
Employment		<.0001			0.07	0.52
Employed	33		1.00	1.00		
Unemployed	45		1.50 [0.87, 2.59]	1.52 [0.80, 2.87]		
Homemaker	27		0.85 [0.59, 1.22]	0.74 [0.31, 1.74]		
Student	71		1.83 [1.05, 3.21]	1.43 [0.66, 3.09]		
Retired	6		0.64 [0.38, 1.08]	0.71 [0.40, 1.28]		
Disabled	27		1.38 [0.70, 2.71]	1.71 [0.68, 4.32]		
Sex		0.09			0.55	0.60
Male	17		1.00	1.00		
Female	17		0.93 [0.73; 1.18]	0.91 [0.65; 1.28]		
Regular Physician		<.0001			0.18	0.31
No	12		1.00	1.00		
Yes	22		1.22 [0.91; 1.64]	1.25 [0.82; 1.90]		
Marital Status		<.0001			0.00	0.02
Not Married	25		1.00	1.00		
Married	48		0.62 [0.47, 0.84]	0.65 [0.46, 0.94]		
Children <18yrs.		0.01			0.92	N/A
None	32		1.00	N/A		
1+	38		1.02 [0.75, 1.38]	N/A		
Cancer History		<.0001			0.01	0.02
Never	36		1.00	1.00		

	Bivariate analyses			Multivariable analyses		
	SNS-user (n=1,112)	χ ² p value	Entire sample of Internet users (n= 4,627) OR [95% CI]	Adjusted Wald p values	Subpopulation of adult Internet users with no minor children (n= 3,031) OR [95% CI]	Adjusted Wald p values
Ever	10		0.58 [0.39, 0.85]		0.57 [0.35, 0.92]	
Insurance status				0.06		0.39
Uninsured	6	0.00	1.00		1.00	
Insured	28		0.69 [0.47; 1.01]		0.80 [0.48; 1.33]	
Survey Mode		0.22		0.31		0.80
Address	20		1.00		1.00	
RDD	14		0.87 [0.67; 1.13]		1.15 [0.81; 1.62]	

Table 3

	SNS-use and Psychological Distress Score		Internet use and Psychological Distress Score	
	β (SE)	<i>p</i> value	β (SE)	<i>p</i> value
			Total survey population (<i>n</i> =6,738)	
			β (SE)	<i>p</i> value
General Internet Use				
Non Internet-user	--	--	0	
Internet-user	--	--	-0.31 (0.26)	0.23
SNS Use				
Non SNS-user	0	0	--	--
SNS-user	0.80 (0.27)	0.00	0.72 (0.34)	0.03