Understanding Digital Technology Access and Use Among New York State Residents to Enhance Dissemination of Health Information

Jennifer A Manganello¹, MPH, PhD; Gena Gerstner², MPH, MS; Kristen Pergolino², AST; Yvonne Graham², RN, MPH; David Strogatz³,4, PhD

¹Department of Health Policy, Management, and Behavior, School of Public Health, University at Albany, Rensselaer, NY, United States
²New York State Department of Health, Office of Minority Health and Health Disparities Prevention, Albany, NY, United States
³Department of Epidemiology and Biostatistics, School of Public Health, University at Albany, Rensselaer, NY, United States
⁴Director, Center for Rural Community Health, Bassett Research Institute, Cooperstown, NY, United States

Corresponding Author:
Jennifer A Manganello, MPH, PhD
Department of Health Policy, Management, and Behavior
School of Public Health
University at Albany
One University Place, #165
Rensselaer, NY, 12144
United States
Phone: 1 5184020304
Fax: 1 5184020414
Email: jmanganello@albany.edu

Abstract

Background: Many state and local health departments, as well as community organizations, have been using new technologies to disseminate health information to targeted populations. Yet little data exist that show access and use patterns, as well as preferences for receiving health information, at the state level.

Objective: This study was designed to obtain information about media and technology use, and health information seeking patterns, from a sample of New York State (NYS) residents.

Methods: A cross-sectional telephone survey (with mobile phones and landlines) was developed to assess media and technology access, use patterns, and preferences for receiving health information among a sample of 1350 residents in NYS. The survey used random digit dialing methodology. A weighted analysis was conducted utilizing Stata/SE software.

Results: Data suggest that NYS residents have a high level of computer and Internet use; 82% have at least one working computer at home, and 85% use the Internet at least sometimes. Mobile phone use is also high; 90% indicated having a mobile phone, and of those 63% have a smartphone. When asked about preferences for receiving health information from an organization, many people preferred websites (49%); preferences for other sources varied by demographic characteristics.

Conclusions: Findings suggest that the Internet and other technologies are viable ways to reach NYS residents, but agencies and organizations should still consider using traditional methods of communication in some cases, and determine appropriate channels based on the population of interest.

(JMIR Public Health Surveill 2016;2(1):e9) doi: 10.2196/publichealth.4442

KEYWORDS
media; New York; Internet; health information; eHealth

Introduction

Interventions using digital technologies to improve health, known as eHealth interventions, have become a topic for theoretical discussion and practical application as an effective way to improve or enable health and health care among diverse populations [1-3]. Digital technology, especially the Internet, has become an increasingly popular health intervention tool.
because of its easy access on a variety of devices (ie, laptops, mobile phones, tablets) and is now a common resource to disseminate and find health information [2,4].

Recent statistics indicate that most people use the Internet [5,6]. In 2013, the Pew Research Center Internet Project Survey reported 85% of adults ages 18 and over are Internet users [5]. However, despite widespread use, variations by age, educational status, and household income remain [6]. National data show that mobile phone use has greatly expanded as well. Recent statistics show that 90% of adults in the United States own a mobile phone, and just more than half (58%) of Americans own a smartphone [7]. Nationally, smartphone ownership is most prevalent among 18-29 year olds (83%) and among those with higher education and income levels [7], which parallels Internet use. The rise in Internet use and smartphone ownership has also led to an increased use of social media (73% of online US adults [8]).

A number of health programs in recent years have used technologies such as text messages and smartphone apps [9,10], and several health interventions have incorporated social media channels [11-13]. Although data on Internet and mobile phone use is widely available at the national level, few states have attempted to collect information at the state level. Many media campaigns and programs that disseminate health information rely on the Internet, mobile phones, and social media channels to provide messages and information at the state level. In order to determine the tools and channels that are most effective in reaching target audiences, it is necessary to understand whether national patterns are representative of media and technology use at the state level and how access and usage may vary among subgroups of the state population.

Working with both internal and external partners, the New York State Department of Health protects the health, productivity, and well-being of all New Yorkers. Of strategic importance is improving the quality and availability of data. Central to this effort is the need for more reliable information about technology use pertaining to the increasingly diverse populations of New York State (NYS). To this end, the New York State Department of Health Office of Minority Health and Health Disparities Prevention (OMH-HDP), in partnership with the University at Albany School of Public Health and Bassett Research Institute, developed the New York State Media and Technology Use Survey study. The aim of the survey was to describe technology use, health information-seeking patterns, and preferences for receiving health information among a sample of NYS residents with oversampling of rural and Hispanic/Latino populations to facilitate future analyses of these subgroups. These subgroups are priority populations to OMH-HDP due to disparate health outcomes and a need to develop and disseminate effective health messages. The analyses for this paper focus on the overall sample of NYS residents; more detailed analyses of the rural and Hispanic/Latino respondents are presented in separate publications [14,15]. In this paper, we address the following questions:

1. What is the level of access to digital technologies, including computers, the Internet, cell phones, smartphones, and texting?
2. What is the frequency of use of various media channels, including email, search engines, online newspapers/magazines, social networking sites (SNS), online videos, video chat, Twitter, online bulletin boards (ie, Pinterest), text messaging, and smartphone apps?
3. What channels are preferred for receiving health information?
4. How do the answers to questions 1 through 3 vary by education, age, sex, ethnicity, race, income, and geographic area?

Methods

The New York State Media and Technology Use Survey is a cross-sectional telephone survey of a sample of NYS residents, ages 18 years and older. It was created to assess the media and technology access and use of NYS residents, along with health information seeking patterns and preferences. Siena Research Institute (SRI), a public opinion research center that conducts surveys, was hired for data collection. Interviews were conducted via a landline or mobile phone with English and Spanish language options available. Trained interviewers collected data by using the computer assisted telephone interviewing system to conduct telephone interviews. The survey was conducted from August 8 through November 4, 2013, and took about 10 minutes to complete. Institutional review board approval was obtained through the University at Albany Office of Regulatory and Research Compliance. This study was considered exempt from full review.

Sample

SRI purchased phone number lists generated using a random digit dialing methodology from Survey Sampling International. Random digit dialing was used for the landline sample to ensure selection of both listed and unlisted telephone numbers, whereas the mobile phone sample was retrieved from dedicated wireless telephone exchanges from within NYS. To ensure a sufficient number of rural respondents, a component of the landline sample targeted the 24 NYS counties not situated in a Metropolitan Statistical Area. Oversampling of Hispanic/Latino respondents was accomplished through a similar targeted random sampling of landlines in census tracts with at least a 20% concentration of Hispanic/Latino residents. Some rural and Hispanic/Latino respondents were also identified in the statewide samples of landlines and mobile phones. The sampling plan from these multiple frames produced a study population of 1350 adults, with 483 identified through their mobile phones.

Measures

The survey asked for demographic information such as geographic area (ie, city/urban, suburban, rural), age, race, ethnicity, sex, education level, employment status, income. number and ages of children, health insurance coverage, and number of doctor visits within the last year. Categories created for race were: White, Black/African American, Asian (ie, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Other Asian, Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander), and Other/Multiple. For analyses, Asian categories were combined, and respondents who chose other or multiple categories were compiled into one group. For
income, a not sure/missing category was created for respondents who refused to answer or were not sure. For other variables, refusals were changed to missing.

Questions on media and technology access and use included the number of working computers in the home, type of Internet access on these computer(s) (ie, dial up, high speed), whether respondents had cellular service throughout the past year, if they had a plan with unlimited texting, whether the phone was a smartphone, and on what device they typically access the Internet. If respondents reported not having Internet access or a mobile phone, or not using the Internet, a follow-up question was asked to establish the reason. Respondents with Internet access were then asked about Internet use and their frequency of use for a variety of Internet and phone-related activities. All respondents were asked the following: “How often do you do each of the following activities? Do not include times you spend doing these activities as part of your job or school.” A range of activities was provided, such as sending or receiving email, using a search engine, using the Internet to read newspapers/magazines, visiting a SNS site, watching or uploading a video, using video chat, participating on Twitter, using an online bulletin board like Pinterest, receiving or sending a text message on a mobile phone, or using an app on a smartphone. Answer choices were: several times a day, once a day, several times a week, once a week, less than once a week, and never.

The following question was developed to assess respondents’ preferences for receiving health information: “This survey is not providing any health information, but if an organization like the Department of Health wanted to provide health information to people in your community, how would you prefer getting the information? For each way of getting the information, rate your level of interest as low, medium, or high.” The channels of communication to rate were: in-person meeting/workshop, mail to your home (eg, brochure), mobile phone app, text message on a mobile phone, website you could go to, email, social media (ie, Facebook), television, and radio. Channels were rotated in order to avoid any bias related specifically to the order of responses. A transition statement earlier in the survey where questions about health information began stated: “By health information, we mean information about health topics such as exercise, nutrition, immunizations, and where to find a health provider. We do not mean information about the treatment of specific medical conditions.”

Analysis
Due to the complex sampling strategy, a weighted analysis was conducted utilizing Stata/SE (StataCorp, College Station, Texas). For this sample, weights were derived to adjust for the sampling procedures, which led to some individuals having greater or lesser probability of being included in the survey. A second stage of weighting was used to adjust the distribution of the sample’s socio-demographic characteristics to match the characteristics of the population of NYS residents age 18 and over. Data were weighted for age, sex, region (ie, Upstate New York, Suburban New York City (NYC), NYC-Metro), rural status, race, ethnicity, education, and mobile phone status. Many respondents did not report income; therefore, data were not weighted for income. Chi-square tests were used to compare respondent groups through bivariate (unadjusted) analyses for key demographic variables: education, age, sex, ethnicity, race, income, and geographic area. Ordinal logistic regression and logistic regression were also used to run adjusted models with all demographics accounted for.

Results
Table 1 presents demographic data for the NYS sample in comparison to all NYS residents. The unweighted sample represents those who participated in the survey, while the weighted sample adjusts for the complex sampling design and also allows for inferences to be made to the general population of the state.
| Demographics                  | NYS Demographics | Unweighted Sample (actual percent surveyed) | Weighted Sample (weighted estimates) |
|------------------------------|------------------|--------------------------------------------|--------------------------------------|
| **Education [16]**           |                  |                                            |                                      |
| High school grad or less     | 41% (434)        | 35%                                        |                                      |
| Some college/vocational degree | 28% (366)      | 31%                                        |                                      |
| College graduate or more     | 31% (537)        | 35%                                        |                                      |
| **Age [17]**                 |                  |                                            |                                      |
| 18-29                        | 23% (289)        | 22%                                        | 23%                                  |
| 30-49                        | 36% (334)        | 36%                                        | 36%                                  |
| 50-59                        | 17% (248)        | 17%                                        |                                      |
| 60 or over                   | 25% (455)        | 25%                                        |                                      |
| **Sex [17]**                 |                  |                                            |                                      |
| Male                         | 48% (594)        | 48%                                        |                                      |
| Female                       | 52% (751)        | 52%                                        |                                      |
| **Ethnicity [18]**           |                  |                                            |                                      |
| Hispanic, Latino/a, or Spanish origin | 17% (412) | 17%                                        |                                      |
| **Race [18]**                |                  |                                            |                                      |
| White                        | 66% (836)        | 65%                                        |                                      |
| Black/African American       | 16% (162)        | 16%                                        |                                      |
| Asian                        | 7% (71)          | 8%                                         |                                      |
| Other/Multiple               | 11% (204)        | 10%                                        |                                      |
| **Household Income [19]**    |                  |                                            |                                      |
| Less than $25,000            | 24% (352)        | 26%                                        |                                      |
| $25,000 to $49,999           | 21% (242)        | 18%                                        |                                      |
| $50,000 to $74,999           | 17% (156)        | 12%                                        |                                      |
| $75,000 or more              | 38% (301)        | 23%                                        |                                      |
| Not sure/Missing             | N/A              | 21%                                        |                                      |
| **Geographic Area [20]**     |                  |                                            |                                      |
| City/Urban                   | 88% (628)        | 56%                                        |                                      |
| Suburban                     | (with urban)     | 33%                                        |                                      |
| Rural                        | 12% (435)        | 11%                                        |                                      |

**Research Question 1:** What is the level of access to digital technologies, including computers, the Internet, cell phones, smartphones, and texting?

A substantial portion (82%) of the sample reported having at least 1 working computer at home and of those, 1090 answered the follow-up question about whether they have Internet access on home computers; 91% reported having high-speed Internet, and only 19 (2%) respondents answered no.

All respondents were asked about their personal use of the Internet; 85% reported using the Internet at least sometimes. Of those, 53% reported using the Internet several times per day. While using a computer or tablet at home is the main way people reported usually accessing the Internet (62%), 29% indicated they use their cell phones to access the Internet. Respondents with lower education ($P=.04$), or who were younger ($P<.0001$), non-white ($P<.0001$), or nonrural ($P=.006$) were more likely to report using their mobile phone as their main way to access the Internet. A number of respondents (n=221) stated they never use the Internet for personal use (not related to school or work). For these respondents, the most common reasons for not accessing the Internet were: no interest in it (37%), no Internet access (17%), and feel that it is too hard to use (10%).

Overall, mobile phone ownership was very common with 90% of respondents indicating they had a mobile phone. Among the respondents who reported owning a mobile phone (n=1197), 63% had a smartphone, 79% had unlimited texting, and 8% did not have cellular service throughout the entire year.
In response to Research Question 4, computer and mobile phone access were compared by key demographic characteristics. Table 2 shows unadjusted and adjusted comparisons. While there were a number of significant findings in the bivariate analyses, once adjusted, results showed that age was an important predictor across all variables. Older people were less likely to report having home computers, broadband access, mobile phones, smartphones, and unlimited texting. Education and income were also important variables in predicting access to home computers and broadband connections, with higher levels resulting in increased access for both. There were fewer demographic differences for mobile phone and smartphone ownership, with age being the main predictor.

**Research Question 2:** What is the frequency of use of various media channels, including email, search engines, online newspapers/magazines, SNS, online videos, video chat, Twitter, online bulletin boards (ie, Pinterest), text messaging, and smartphone apps?

The most common activities included using email or search engines. Only 21% reported never using email, and only 17% reported never using a search engine. There were a number of activities that a large number of respondents reported never doing: using SNS like Facebook (40%), watching or uploading videos on a site like YouTube (40%), reading newspapers or magazines online (49%), and using video chat services like Skype (61%). Over two-thirds (75%) said they never used SNS for health purposes. Regarding activities specific to mobile phone use, only 17% reported never sending text messages; 26% reported never using mobile phone apps, and over half (56%) said they never used mobile phone apps for health purposes.

To further support findings in response to Research Question 4, Table 3 presents demographic comparisons of activities conducted using the Internet and mobile phones as reported by respondents. A majority of the sample reported never using Twitter (86%) and online bulletin boards like Pinterest (88%); therefore, those 2 activities are not included in the table.

While age was an important predictor of activities involving the Internet and mobile phones, education also appeared to be important, remaining significant even after adjusting for other demographics. Older respondents as well as respondents with lower educational attainment were less likely to report doing most of the activities listed. Some activities—such as online search engine use—could be predicted by income, yet others—such as text messaging—could not. Also of note is that Asian respondents appeared to be much more likely to engage in most activities than other races. Geographic area of residence or being Hispanic/Latino or male (with the exception of using online videos) did not appear to be a significant predictor for any activity after controlling for other demographics.

**Research Question 3:** What channels are preferred for receiving health information?

When asked about receiving health information from an organization, many respondents said they preferred getting information from websites. The general population (49%) rated websites as a high preference, more than any other channel of communication. After websites, the next most preferred channels were television (35%), mail (eg, brochure) (35%), and email (29%). Fewer respondents had a high preference for receiving health information via smartphone apps (25%), in-person meetings (25%), text messages (22%), radio (20%), and SNS (17%).

Table 4 presents comparisons for information preferences across demographics. There are a number of differences by demographics across all methods for receiving health information per the bivariate analyses. When adjusting for all demographics, some notable differences remained. Respondents with higher education were significantly more likely to prefer websites and email, but less likely to prefer TV, than those with lower education levels. Income was also a predictor, with respondents at higher incomes reporting a stronger preference for websites and email.
Table 2. Internet and mobile phone use and access for New York State respondents (n=1350 except where noted; weighted estimates, unadjusted and adjusted using logistic regression\(^1\)).

| Demographic Characteristic       | % working computer at home | % broadband access at home (n=1093) | % have mobile phone | % have unlimited texting (n=1197) | % have smartphone (n=1197) |
|----------------------------------|-----------------------------|-------------------------------------|---------------------|----------------------------------|-----------------------------|
| **Education**                    |                             |                                     |                     |                                  |                             |
| High school graduate or less     | P<.0001                     | P=.0003                             | P=.0005             | P=.0779                          | P=.0006                     |
| Some college/vocational degree   | 66%                         | 88%                                 | 85%                 | 74%                             | 54%                         |
| College graduate or more         | 84%***                      | 93%                                 | 89%                 | 82%                             | 64%*                        |
|                                  | 96%***                      | 97%*                                | 95%                 | 80%                             | 70%**                       |
| **Age**                          |                             |                                     |                     |                                  |                             |
| 18-29                            | 89%                         | 97%                                 | 93%                 | 90%                             | 86%                         |
| 30-49                            | 88%                         | 96%                                 | 94%                 | 85%                             | 73%**                       |
| 50-59                            | 82%*                        | 92%**                               | 96%                 | 75%**                           | 51%***                      |
| 60 or over                       | 66%***                      | 85%***                              | 75%***              | 55%***                          | 28%***                      |
| **Sex**                          |                             |                                     |                     |                                  |                             |
| Female                           | P=.0482                     | P=.6778                             | P=.0030             | P=.1003                          | P=.0147                     |
| Male                             | 79%                         | 93%                                 | 87%                 | 76%                             | 58%                         |
| **Ethnicity**                    |                             |                                     |                     |                                  |                             |
| Non-Hispanic, Latino/a, or Spanish origin | 83%                 | 93%                                 | 91%                 | 79%                             | 61%                         |
| Hispanic, Latino/a, or Spanish origin | 78%                 | 91%*                                | 83%*                | 80%                             | 73%                         |
| **Race**                         |                             |                                     |                     |                                  |                             |
| White                            | 83%                         | 93%                                 | 90%                 | 75%                             | 56%                         |
| Black/African American           | 73%                         | 90%                                 | 90%                 | 89%*                            | 73%**                       |
| Asian                            | 97%***                      | 94%                                 | 91%                 | 80%                             | 93%**                       |
| Other/Multiple                   | 77%                         | 94%                                 | 84%                 | 83%                             | 63%                         |
| **Household Income**             |                             |                                     |                     |                                  |                             |
| Less than $25,000                | P<.0001                     | P=.6919                             | P=.4203             | P=.0157                          | P<.0001                     |
| $25,000 to $49,999               | 68%                         | 90%                                 | 86%                 | 82%                             | 60%                         |
| $50,000 to $74,999               | 85%**                       | 88%                                 | 89%                 | 80%                             | 63%                         |
| $75,000 or more                  | 92%**                       | 97%                                 | 97%*                | 77%                             | 59%                         |
| Not sure/Missing                 | 97%***                      | 99%**                               | 96%*                | 80%                             | 73%**                       |
| **Geographic Area**              |                             |                                     |                     |                                  |                             |
| Urban                            | 79%                         | 94%                                 | 90%                 | 80%                             | 66%                         |
| Suburban                         | 89%                         | 95%                                 | 93%                 | 80%                             | 64%                         |
| Rural                            | 75%                         | 84%*                                | 79%**               | 67%                             | 43%                         |

Reference group is the first group listed for each demographic characteristic.

\(^1\)Unadjusted P-values of significance are indicated in the table.

Adjusted P-values of significance are noted as follows: *<.05; **<.01; ***<.0001
Table 3. Frequency of Internet- and mobile phone-related activities for New York State respondents (n=1350; weighted estimates, unadjusted and adjusted using ordinal logistic regression).

|                                | Internet use: % | Email: % | Search engine: % | Texts: % | Video chat: % | Use videos: % | SNS for health: % | SNS: % | Read news/mags: % | Use apps: % | Apps for health: % | Apps: % | Health apps: % |
|--------------------------------|----------------|---------|------------------|---------|--------------|---------------|-------------------|-------|------------------|------------|-------------------|--------|---------------|
|                                | Never          | Never   | Never            | Never   | Never        | Never         | Never            | Never | Never            | Never     | Never            | Never   | Never         |
| **Education**                  |                |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| High school or less            | 30%            | 40%     | 34%              | 70%     | 53%          | 69%           | 55%              | 77%   | 25%              | 43%       | 55%              |         |              |
| Some college/Vocational degree | 12%***         | 17%***  | 14%***           | 46%***  | 34%**        | 73%           | 33%**            | 59%** | 15%**            | 23%**     | 52%              |         |              |
| College graduate or more       | 3%***          | 6%***   | 3%***            | 29%***  | 31%**        | 82%           | 27%**            | 47%** | 10%**            | 13%***    | 58%              |         |              |
| **Age**                        |                |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| 18-29                          | 4%             | 10%     | 5%               | 37%     | 14%          | 72%           | 15%              | 50%   | 1%               | 9%        | 47%              |         |              |
| 30-49                          | 7%***          | 13%     | 9%***            | 40%     | 28%***       | 78%           | 28%***           | 54%** | 8%***            | 19%**     | 53%              |         |              |
| 50-59                          | 16%***         | 29%***  | 19%***           | 55%***  | 50%***       | 76%           | 48%***           | 72%** | 18%***           | 28%***    | 74%**           |         |              |
| 60 or over                     | 35%***         | 40%***  | 38%***           | 67%***  | 60%***       | 76%           | 71%***           | 82%** | 48%***           | 66%***    | 69%*            |         |              |
| **Sex**                        |                |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| Female                         | 17%            | 24%     | 20%              | 53%     | 39%          | 74%           | 42%              | 61%   | 19%              | 30%       | 50%              |         |              |
| Male                           | 12%            | 17%     | 14%              | 44%**   | 40%**        | 77%           | 35%*             | 61%   | 14%              | 21%       | 60%              |         |              |
| **Hispanic, Latino/a, or Spanish** |            |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| No                             | 14%            | 20%     | 16%              | 48%     | 40%          | 79%           | 39%              | 60%   | 17%              | 25%       | 56%              |         |              |
| Yes                            | 16%            | 25%     | 19%              | 51%     | 34%          | 61%           | 35%              | 62%   | 11%              | 28%       | 51%              |         |              |
| **Race**                       |                |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| White                          | 14%            | 20%     | 16%              | 48%     | 43%          | 79%           | 41%              | 62%   | 19%              | 25%       | 58%              |         |              |
| Black/African American         | 23%*           | 28%     | 25%              | 56%     | 39%          | 76%           | 42%              | 67%   | 14%              | 30%       | 53%              |         |              |
| Asian                          | 3%             | 5%      | 4%*              | 27%*    | 21%          | 65%           | 20%*             | 34%*  | 4%              | 16%       | 48%              |         |              |
| Other/Multiple                 | 17%            | 26%     | 20%              | 49%     | 33%          | 64%           | 34%              | 59%   | 12%              | 30%       | 49%              |         |              |
| **Household Income**           |                |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| Less than $25,000              | 23%            | 31%     | 28%              | 57%     | 41%          | 60%           | 49%              | 65%   | 17%              | 34%       | 59%              |         |              |
| $25,000 to $49,999             | 14%            | 20%     | 13%**            | 53%     | 41%          | 72%           | 40%              | 67%   | 17%              | 34%       | 51%              |         |              |
| $50,000 to $74,999             | 5%*            | 9%*     | 4%***            | 31%     | 31%          | 90%***         | 24%              | 50%   | 16%              | 11%**     | 55%              |         |              |
| $75,000 or more                | 2%***          | 7%***   | 5%***            | 57%**   | 37%          | 81%*           | 26%*             | 51%   | 12%              | 9%**      | 54%              |         |              |
| Not sure/Missing               | 26%            | 33%     | 31%              | 34%     | 45%          | 79%**          | 49%              | 69%   | 23%              | 37%       | 72%**           |         |              |
| **Geographic Area**            |                |         |                  |         |              |               |                   |       |                  |           |                  |         |              |
| $=.2818                        | P<.0001        | P<.001  | P<.0001          | P<.001  | P<.0001      | P<.0001        | P<.0001          | P<.0001 | P<.0001          | P<.0001   | P<.0001          | P<.0001 | P<.0001      |
| P=.061                         | P=.080         | P=.0080 | P=.0002          | P=.0823 | P=.3315      | P=.001          | P=.0223          | P=.086  | P=.064           | P=.208    | P=.208           |         |              |
| P=.3955                        | P=.082         | P=.2321 | P=.3031          | P=.061  | P=.0087      | P=.0264         | P=.058           | P=.050  | P=.556           |         |                 |         |              |
| P=.0001                        | P=.0006        | P<.0001 | P=.0026          | P=.0189 | P=.1144      | P=.001          | P=.001           | P=.001  | P=.001           | P=.001    | P=.001           | P=.001  | P=.0210      |
| P=.0002                        | P=.0001        | P=.0001 | P=.0001          | P=.0177 | P=.0002      | P=.0001         | P=.001           | P=.001  | P=.015           | P=.0725   | P=.0001          | P=.001  | P=.040       |
| P=.0004                        | P=.0171        | P=.0332 | P=.0291          | P=.0021 | P=.0003      | P=.0040         | P=.0241          | P=.0724 |                 |         |                 |         |              |

http://publichealth.jmir.org/2016/1/e9/
|                  | Internet use: % Never | Email: % Never | Search engine: % Never | Read news/mags: % Never | SNS: % Never | SNS for health: % Never | Use videos: % Never | Video chat: % Never | Texts: % Never | Apps: % Never | Health apps: % Never |
|------------------|----------------------|----------------|------------------------|------------------------|-------------|------------------------|-------------------|-------------------|----------------|--------------|-------------------|
| Urban            | 16%                  | 23%            | 19%                    | 48%                    | 38%         | 71%                    | 39%               | 60%               | 16%           | 26%          | 55%               |
| Suburban         | 9%                   | 14%            | 11%                    | 47%                    | 39%         | 82%                    | 34%               | 58%               | 15%           | 19%          | 55%               |
| Rural            | 20%                  | 29%            | 22%                    | 57%                    | 50%         | 77%                    | 52%               | 75%               | 25%           | 45%          | 61%               |

Reference group is the first group listed for each demographic characteristic.

1Unadjusted P-values of significance are indicated in the table.
Adjusted P-values of significance are noted as follows: *<.05; **<.01; ***<.0001
Table 4. Preferred media channels for receiving health information for New York State respondents (n=1350; weighted estimates, unadjusted and adjusted using ordinal logistic regression\(^1\)).

|                      | Website: % High | TV: % High | Mail: %High | Email: % High | In-person: % High | Phone app: % High | Text: % High | Radio: % High | SNS: % High |
|----------------------|----------------|------------|------------|---------------|------------------|-----------------|-------------|--------------|------------|
| **Education**        |                |            |            |               |                  |                 |             |              |            |
| High school grad or less | P < .0001     | P = .0044  | P = .4485  | P < .0001     | P = .0884        | P < .0333       | P = .0844   | P = .8113    | P = .1356  |
| Some college/vocational degree | 33%           | 43%        | 35%        | 24%           | 25%              | 21%             | 26%         | 21%          | 19%        |
| College graduate or more | 55%***        | 32%*       | 38%        | 29%*          | 29%              | 25%*            | 22%         | 20%          | 15%        |
|                      | P = .0844      |            |            |               |                  |                 |             |              |            |
| **Age**              |                |            |            |               |                  |                 |             |              |            |
| 18-29                | P < .0001      | P = .7332  | P = .0851  | P < .0001     | P = .0120        | P < .0001       | P = .3081   | P < .0001    | P = .6992  |
| 30-49                | 62%            | 33%        | 30%        | 33%           | 26%              | 37%             | 31%         | 19%          | 28%        |
| 50-59                | 55%***         | 33%        | 32%        | 35%           | 24%              | 32%*            | 29%         | 19%          | 20%**      |
| 60 or over           | 51%***         | 39%*       | 37%*       | 27%*          | 32%              | 15%***          | 14%***      | 26%          | 12%***     |
|                      | P < .0001      | P = .4376  | P = .0025  | P = .6626     | P = .8212        | P = .1646       | P = .9592   | P = .4376    | P = .6992  |
| **Sex**              |                |            |            |               |                  |                 |             |              |            |
| Female               | P = .2074      | P = .1689  | P = .0025  | P = .6626     | P = .8212        | P = .1646       | P = .9592   | P = .4376    | P = .6992  |
| Male                 | 47%            | 36%        | 41%        | 27%           | 26%              | 24%             | 21%         | 19%          | 18%        |
|                      | P < .0001      | P = .0002  | P = .0002  | P = .0001     | P < .0001        | P < .0001       | P < .0001   | P < .0001    | P < .0001  |
| **Hispanic, Latino/a, or Spanish** | P = .8131      | P = .0002  | P = .0002  | P = .0083     | P < .0001        | P < .0001       | P < .0001   | P < .0001    | P < .0001  |
| No                   | 49%            | 33%        | 34%        | 27%           | 24%              | 23%             | 19%         | 19%          | 15%        |
| Yes                  | 48%            | 44%*       | 44%**      | 36%           | 31%              | 36%*            | 32%         | 23%          | 27%*       |
|                      | P < .0001      | P = .0350  | P = .0179  | P = .0006     | P = .0749        | P < .0001       | P < .0001   | P < .0013    | P < .0001  |
| **Race**             |                |            |            |               |                  |                 |             |              |            |
| White                | 49%            | 31%        | 34%        | 25%           | 23%              | 19%             | 15%         | 17%          | 11%        |
| Black/African American | 55%*          | 42%*       | 41%        | 36%           | 30%              | 33%**           | 35%**       | 30%          | 23%*       |
| Asian                | 41%            | 35%        | 18%        | 31%           | 27%              | 37%*            | 21%         | 9%           | 26%**      |
| Other/Multiple       | 47%            | 47%*       | 44%        | 40%*          | 32%              | 37%*            | 38%         | 30%*         | 32%*       |
|                      | P < .0001      | P = .0073  | P = .0359  | P < .0001     | P = .3229        | P < .0019       | P < .0003   | P = .3551    | P = .1207  |
| **Household Income** |                |            |            |               |                  |                 |             |              |            |
| Less than $25,000    | 38%            | 40%        | 39%        | 27%           | 26%              | 22%             | 27%         | 22%          | 22%        |
| $25,000 to $49,999   | 52%            | 40%        | 30%        | 27%           | 24%              | 26%             | 23%         | 18%          | 14%*       |
| $50,000 to $74,999   | 56%*           | 32%        | 30%*       | 27%           | 23%              | 26%             | 12%**       | 20%          | 19%        |
| $75,000 or more      | 68%***         | 28%        | 31%*       | 40%***        | 22%              | 33%**           | 21%         | 21%          | 14%        |
| Not sure/Missing     | 34%            | 33%        | 34%**      | 21%           | 26%              | 16%             | 20%*        | 19%*         | 14%        |
|                      | P = .0178      | P = .4264  | P = .2260  | P = .0167     | P = .2434        | P < .0001       | P < .0001   | P = .0582    | P = .0040  |
| **Geographic area**  |                |            |            |               |                  |                 |             |              |            |
| Urban                | 49%            | 36%        | 32%        | 32%           | 27%              | 28%             | 27%         | 22%          | 20%        |
| Suburban             | 53%            | 34%        | 38%*       | 27%           | 25%              | 23%             | 16%         | 17%          | 14%        |
| Rural                | 42%            | 32%        | 39%        | 20%           | 17%              | 13%             | 11%**       | 14%          | 10%        |

Reference group is the first group listed for each demographic characteristic.

\(^1\) Unadjusted P-values of significance are indicated in the table.
Discussion

Principal Findings

For this sample, there was high Internet and mobile phone use, and many respondents had high-speed Internet access. This group also reported a high level of engagement with Internet- and mobile phone-related activities, especially with texting. Thus, NYS respondents are similar in many ways to national samples regarding Internet use and mobile phone ownership. In fact, some percentages are identical: 85% of NYS respondents in this sample report using the Internet, compared to 85% nationally, and 90% of respondents have a mobile phone, compared to 90% nationally [5,21]. Considering these high numbers, it appears reasonable that organizations can use the Internet and mobile phones to disseminate health information and support interventions.

Still, there are some differences across demographics. Similar to national data noted in the Introduction section, this research found that those who are older, have fewer years of education, and are in lower income brackets are less likely to use the Internet. Age and income, and sometimes education, also seem to be important in explaining differences in usage of technologies and preferences for information. These results are similar to what has been found with national samples [22]. While national data show similar trends for smartphone use, income and education do not seem to impact smartphone use as much as age does in NYS. And, different from other research [23], in this sample, income was the biggest predictor of using SNS for health, as opposed to age; those with lower incomes were more likely to use SNS for health.

Despite the widespread access to digital technologies, these findings suggest there are many variations in what people do online and with their mobile phones. For instance, respondents were more likely to use text messages than SNS and, when compared to national results of the 2013 Pew Research Internet Project (73%), this sample used SNS less (60%) (SNS use for health was similar to that in other research, 25% compared to 32% [23]). It is also important to remember there are variations not measured here with respect to specific websites or tools. Different groups may prefer different SNS. For example, LinkedIn users tend to be highly educated and come from higher income households [24].

Given the variation among Internet and mobile phone activities, it is recommended that public health groups seeking to disseminate health information should consider specific technology access and use patterns and preferences of the target population when developing a communication plan. Although there are a number of new and unique channels, many NYS respondents preferred getting information from organizations on websites. Having a website where people can go for information is a useful strategy, with other channels such as text messages, social media, and videos used to not only publicize the website but to also provide alternative modes of communication. It is of interest that television and mail (ie, a brochure) were the second and third preferred modes of communication, showing that even with the increased utilization of digital technologies, traditional communication channels are still viable methods for sharing information. Of note, those who were older or reported less education were less likely to prefer websites and email.

Even though these data support the idea that digital channels for communication can effectively and efficiently reach many people, they may not be the only channels to use when disseminating health-related resources and information, especially for certain populations. Traditional information sources such as brochures, television, billboards, bus signs, and radio should be considered as well. Offline information sources could be developed to supplement any online information dissemination activities. This would allow better access for those who do not regularly interact with online or new technology platforms.

Further, the goals of any public health communication program or intervention should be evaluated using data to inform decisions about which information channels would be most effective at reaching the target population. It is also important to consider the pros and cons of each channel being considered. For instance, while many use social media to deliver information, the strength of social media is that people can interact with each other and provide user-generated comments and information. There are instances where this may be ideal, but this approach could also lead to issues such as misinformation.

Limitations

While this study provides important information from a sample of NYS residents, there were many complexities associated with the nature of a cross-sectional phone survey, compounded by the ever-changing dynamics of media and technology. Among them, there was limited time to conduct the survey. Questions were tested prior to finalizing the survey to ensure that the call lasted only 10 minutes. Although a substantial number of questions were asked, we did not have time to fully explore respondents’ experiences using media and technology for health information. Sample selection was intended to target specific subpopulations (ie, Rural, Hispanic/Latino, mobile phone users). To ensure that the sample was representative of NYS, weighted adjustments were calculated to provide a more accurate depiction. In addition, interviewers did not ask about all possible communication channels. While questions referred to social media sites, respondents may not have considered sites like YouTube or blogs as belonging in that category. These channels could prove useful depending on the target population, and video-based sites like YouTube might be especially suitable to some groups. Finally, we asked about preferences for receiving information in a general way. It may be that responses could have been different if asked about specific health topics. However, we did provide guidance as to what we meant by “health information.” It may also be that respondents interpreted “if an organization like the Department of Health” in different ways; people may not be familiar with the work of the Department of Health, or think it only has certain functions, such as tracking diseases. This may have impacted responses to this question.
Conclusions
This study represents an important first step in exploring media and technology use for public health purposes at the state level, but there is a need for future research on specific populations to examine how variables beyond the demographics presented here impact media and technology use, and health information-seeking activities and preferences. Factors such as language, culture, and health literacy could all potentially impact media and technology use and preferences for receiving health information. For example, there is a growing realization that even though there has been a decrease in the digital divide with respect to access, there is a growing divide regarding skills [25]. Additional research can also explore how preferences for information dissemination may vary by topic.

Acknowledgments
This research was funded by the New York State Department of Health, Office of Minority Health, and Health Disparities Prevention.

The authors acknowledge Siena Research Institute for data collection as well as Jessica Coyle and Angela Falisi for their contributions as graduate student interns from the University at Albany, School of Public Health. Student efforts were supported by the Empire State Public Health Training Center within the Center for Public Health Continuing Education at the University at Albany School of Public Health.

Conflicts of Interest
None declared.

References
1. Eng TR. eHealth research and evaluation: Challenges and opportunities. J Health Commun 2002 Mar;7(4):267-272. [doi: 10.1080/10810730290001747] [Medline: 12356287]
2. Korda H, Itani Z. Harnessing social media for health promotion and behavior change. Health Promot Pract 2013 Jan;14(1):15-23. [doi: 10.1177/1524839911405850] [Medline: 21558472]
3. Neiger BL, Thackeray R, Van Wagenen SA, Hanson CL, West JH, Barnes MD, et al. Use of social media in health promotion: Purposes, key performance indicators, and evaluation metrics. Health Promot Pract 2012 Mar;13(2):159-164. [doi: 10.1177/1524839911433467] [Medline: 22382491]
4. Volkman JE, Luger TM, Harvey KL, Hogan TP, Shimada SL, Amante D, et al. The National Cancer Institute's Health Information National Trends Survey [HINTS]: A national cross-sectional analysis of talking to your doctor and other healthcare providers for health information. BMC Fam Pract 2014;15:111 [FREE Full text] [doi: 10.1186/1471-2296-15-111] [Medline: 24906558]
5. Zickuhr K. Pew Research Center’s Internet & American Life Project. 2013 Sep 25. Who’s Not Online and Why URL: http://www.pewinternet.org/files/old-media/Files/Reports/2013/PIP_Offline%20adults_092513_PDF.pdf [accessed 2015-03-19] [WebCite Cache ID 6X96VAVyj]
6. Zickuhr K, Smith A. Pew Research Center. 2013 Aug 26. Home Broadband 2013 URL: http://www.pewinternet.org/2013/08/26/home-broadband-2013/ [accessed 2015-03-19] [WebCite Cache ID 6X96dz0vF]
7. Fox S, Rainie L. Pew Research Center. 2014 Feb 27. The Web at 25 in the U.S URL: http://www.pewinternet.org/2014/02/27/the-web-at-25-in-the-u-s/ [accessed 2015-03-19] [WebCite Cache ID 6X96twFxF]
8. Pew Internet Project. Social Networking Fact Sheet URL: http://www.pewinternet.org/fact-sheets/social-networking-fact-sheet/ [accessed 2015-03-19] [WebCite Cache ID 6X979xKeD]
9. Buchholz S, Wilbur J, Ingram D, Fogg L. Physical activity text messaging interventions in adults: A systematic review. Worldviews on Evidence–Based Nursing 2013;10(3):163-173.
10. Free C, Phillips G, Galli L, Watson L, Felix L, Edwards P, et al. The effectiveness of mobile-health technology-based health behaviour change or disease management interventions for health care consumers: A systematic review. PLoS Med 2013 Jan;10(1):e1001362 [FREE Full text] [doi: 10.1371/journal.pmed.1001362] [Medline: 23349621]
11. Chang T, Chopra V, Zhang C, Woolford SJ. The role of social media in online weight management: Systematic review. Journal of Medical Internet Research 2013 Nov 28;15(11):e262.
12. Hamm MP, Shulhan J, Williams G, Milne A, Scott SD, Hartling L. A systematic review of the use and effectiveness of social media in child health. BMC Pediatr 2014;14:138 [FREE Full text] [doi: 10.1186/1471-2431-14-138] [Medline: 24886048]

http://publichealth.jmir.org/2016/1/e9/
13. Williams G, Hamm MP, Shulhan J, Vandermeer B, Hartling L. Social media interventions for diet and exercise behaviours: A systematic review and meta-analysis of randomised controlled trials. BMJ Open 2014 Feb;4(2):e003926 [FREE Full text] [doi: 10.1136/bmjopen-2013-003926] [Medline: 24525388]

14. Manganello JA, Gerstner G, Pergolino K, Graham Y, Falisi A, Strogatz D. Health literacy and health information seeking among New York State residents. Journal of Public Health Management and Practice 2016. [doi: 10.1007/PHH.00000000000366]

15. Manganello J, Gerstner G, Pergolino K, Graham Y, Strogatz D. Media and Technology Use Among Hispanics/Latinos in New York: Implications for Health Communication Programs. J. Racial and Ethnic Health Disparities 2015 Oct 20. [doi: 10.1007/s40615-015-0169-9]

16. US Census Bureau. Sex by age by educational attainment for the population 18 years and over: 2012 American Community Survey 1-year estimates URL: http://goo.gl/ogFzep [accessed 2015-11-12] [WebCite Cache ID 6gk8UoX74]

17. New York State Department of Health. Estimated population by age, sex, and region, New York State —2010 URL: http://www.health.ny.gov/statistics/vital_statistics/2010/table01.htm [accessed 2015-11-12] [WebCite Cache ID 6gk7O4ZFN]

18. US Census Bureau. Resident population by race and state: 2010 URL: http://www.census.gov/2010census/popmap/pimtext.php?fl=36 [accessed 2015-11-12] [WebCite Cache ID 6gk8G9pc9]

19. US Census Bureau. Selected economic characteristics: 2012 American Community Survey 1-year estimates URL: http://goo.gl/GOflK [accessed 2015-11-12] [WebCite Cache ID 6gk7amUJd]

20. US Census Bureau. 2010 census urban and rural classification and urban area criteria: Lists of population, land area, and percent urban and rural in 2010 and changes from 2000 to 2010—percent urban and rural in 2010 by state [XLS] URL: http://www.census.govgeo/reference/ua/urban-rural-2010.html [accessed 2015-11-12] [WebCite Cache ID 6gk7eUGgB]

21. Pew Research Center. Cell Phone and Smartphone Ownership Demographics URL: http://www.pewinternet.org/data-trend/mobile/cell-phone-and-smartphone-ownership-demographics/ [accessed 2015-03-19] [WebCite Cache ID 6X97IKJin]

22. Kontos E, Blake KD, Wen-Ying Chou S, Prestin A. Predictors of eHealth usage: Insights on the digital divide from the Health Information National Trends Survey 2012. J Med Internet Res 2014 Jul;16(7):e172 [FREE Full text] [doi: 10.2196/jmir.3117] [Medline: 25048379]

23. Thackeray R, Crookston BT, West JH. Correlates of health-related social media use among adults. J Med Internet Res 2013 Jan;15(1):e21 [FREE Full text] [doi: 10.2196/jmir.2297] [Medline: 23367505]

24. Duggan M, Smith A. Pew Research Center. 2013 Dec 30. Social Media Update 2013 URL: http://www.pewinternet.org/Reports/2013/Social-Media-Update.aspx [accessed 2015-03-19] [WebCite Cache ID 6X97Tm6f]

25. van Deursen A, van Dijk J. Internet skills and the digital divide. New Media & Society 2010 Dec 06;13(6):893-911. [doi: 10.1177/1461448108386774]

Abbreviations

NYC: New York City
NYS: New York State
OMH-HDP: Office of Minority Health and Health Disparities Prevention
SNS: social networking sites
SRI: Siena Research Institute

©Jennifer A Manganello, Gena Gerstner, Kristen Pergolino, Yvonne Graham, David Strogatz. Originally published in JMIR Public Health and Surveillance (http://publichealth.jmir.org), 18.04.2016. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR Public Health and Surveillance, is properly cited. The complete bibliographic information, a link to the original publication on http://publichealth.jmir.org, as well as this copyright and license information must be included.

http://publichealth.jmir.org/2016/1/e9/