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Integrating Emergency Care with Population Health

Special Issue from the Emory Center for Injury Control

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Social Media, Public Scholarship, and Injury Prevention

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This marks the Emory Center for Injury Control's fifth special issue on injury prevention and control. Each year we have tried to identify important themes for injury prevention and public health, such as bridging research to practice, multidisciplinary collaborations, and vulnerable populations. This year our focus is on using social media in injury prevention practice and research.

Social media, including Facebook, Twitter, Snapchat, and other venues, is quickly becoming a normal means of communication. For example, Facebook has 1.28 billion users, Linked In has 300 million users, and Twitter has 255 million users.[1] Although some of these venues are used more for personal updates and networks, these venues can also be used for communicating with others for education and research purposes. For example, Facebook has been used to recruit gay men for intimate partner violence research, and traumatic brain injury patients reporting connecting on Facebook groups for support.[2-4] Twitter has been studied as a surveillance tool for real-time suicide risk factors, as well as used to warn local residents to seek shelter during a tornado with a corresponding decrease in injuries treated in emergency departments (ED).[5,6]

The potential for using these venues for dissemination of information and bi-directional communication with the public is great, but we have not yet tapped the full potential when it comes to public health promotion. Currently only about one-fourth of physicians use two or more social media venues for connecting professionally. Mishori et al reported that several medical organizations had very few shared followers and re-tweets were low, suggesting that these organizations have not yet harnessed the potential for greater dissemination and linkages through social media.[7] They further recommended that medical groups should work towards a cohesive community of shared followers and that tweet content must be engaging to reach greater audiences. Similarly, although most state health departments have Twitter or Facebook accounts, most average a daily post – with most posts used to disseminate information, and with very little interaction with their audience/followers on social media.[8]

One paper in our special issue presents an approach for how to best mitigate concerns and maximize returns when using social media strategies for non-profits in injury prevention and presents strategies for how to implement social media campaigns in injury prevention specifically.[9] Furthermore, social media research can provide insight into how to tailor public health interventions toward vulnerable populations and about potentially sensitive injury topics, including abuse. In this special issue, Morris et al presents empirical findings from a recent study that assessed the use of social media during public emergencies by people with disabilities.[10] This is a particularly relevant topic for use of new social media strategies as people with disabilities may be more vulnerable during disasters and public emergencies than the general population.[10] Kim et al studied patient preferences for technology-based behavioral interventions relative to patient gender, finding that most ED patients were generally receptive to behavioral interventions via computers and social media, but that access and receptivity depended on complex interactions between gender and other demographic factors, such as age.[11] Similarly, Eduards-Guara et al found a high level of baseline access to and use of social media among parents deemed at risk for child maltreatment, and found a high level of receptivity to a parenting skills workshop that integrated in-person meetings with online, Facebook-enabled discussions and interactions.[12]

Social media research is also an important way to engage and understand the behavior of adolescents and young adults, many of whom have unique insights into the role of social media in their own lives, as demonstrated by the study by Parris et al who used qualitative interviewing methods to explore high school students' perspectives on the steps adults might take to prevent cyber bullying.[13] Similarly, Swahn et al present research about the prevalence of mobile phone ownership and phone usage among youth living in the slums of Kampala, underscoring the importance of the evolving communications landscape when studying health among youth, and the role of the changing mobile phone and Internet access even in remote or impoverished settings.[14] For each of these populations, understanding and harnessing the use of new communication technologies is key for presenting public health messaging and interventions in ways that are accessible and relevant for the target audience.

Finally, in some cases new communication technology itself creates a new risk factor for injury, and leads to new challenges for healthcare providers and injury prevention researchers, an issue addressed by Mathew et al who found that text messaging while driving, a known risk factor for motor vehicle collisions, persisted, even among physicians, after implementation of a statewide ban.[15]

Social media is but one aspect of engaging with the public. We must also consider formal venues through mainstream media such as opinion-editorial pieces. Most academicians do not engage in public scholarship because many promotion and tenure committees do not reward or recognize these activities. However, op-ed pages are among the most viewed sections of newspapers and online news sources and thus can inform injury prevention policy, funding, and public opinions. One of us (DH) has been a participant in Emory's Public Voices Fellowship Program, led by the OpEd Project (www.theopedproject.org). The goal of this program is to increase the number of under-represented voices including academicians in pp-ed pages. Our Center has sponsored six faculty to go through the program to date at Emory, resulting in over 20 op-ed pieces in the past two years. One piece in the Huffington Post for Domestic Violence Awareness Month was "liked" on Facebook over 800 times and shared on Twitter nearly 100 times.[16] In comparison, the impact factor for most injury journals is 10 or less.[17] If we hope to impact injuries and increase prevention efforts and funding priorities in these areas, we need to increase societal awareness through these venues. Our hope is this journal issue will begin this conversation.

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Use of Social Media During Public Emergencies by People with Disabilities

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Introduction: People with disabilities are generally more vulnerable during disasters and public emergencies than the general population. Physical, sensory and cognitive impairments may result in greater difficulty in receiving and understanding emergency alert information, and greater difficulty in taking appropriate action. The use of social media in the United States has grown considerably in recent years. This has generated increasing interest on the part of national, state and local jurisdictions in leveraging these channels to communicate public health and safety information. How and to what extent people with disabilities use social and other communications media during public emergencies can help public safety organizations understand the communication needs of the citizens in their jurisdictions, and plan their social media and other communications strategies accordingly.

Methods: This article presents data from a survey on the use of social media and other communications media during public emergencies by people with disabilities conducted from November 1, 2012 through March 30, 2013.

Results: The data presented here show four key results. First, levels of use of social media in general are high for people with disabilities, as well as for the general population. Second, use of social media *during emergencies* is still low for both groups. Third, levels of use of social media are not associated with income levels, but are significantly and strongly associated with age: younger people use social media at higher rates than older people in both groups ($p<0.001$). Fourth, differences in the use of social media during emergencies across disability types are slight, with the exception of deaf and hard-of-hearing respondents, the former more likely to have used social media to receive ($p=0.002$), verify ($p=0.092$) and share ($p=0.007$) emergency information.

Conclusion: These last two results suggest that effective emergency communications strategies need to rely on multiple media types and channels to reach the entire community. [West J Emerg Med. 2014;15(5):567–574.]

INTRODUCTION

The use of social media has grown considerably in recent years, from 8% of internet users in 2005 to 72% in 2013, according the Pew Research Center.[1] This trend has spurred national, state and local organizations to develop programs to leverage these channels to communicate public health and safety information. Whether and how the public uses social media during emergencies is critically important for designing public safety programs and protocols, and ultimately for public safety outcomes.

An estimated 56.7 million people in the United States (or about 19% of the population) have at least one disability, according to the 2010 U.S. Census Bureau.[2] The differential access to specific forms of communications and the greater vulnerability of people with disabilities during public emergencies[3–5] makes understanding their use of communications media under emergency conditions critically important. The core question, "Is there a 'disability divide' in the use of social media by people with disabilities versus the general population" will be addressed through analysis of the following data:

a. Percentage of people with disabilities using social media
b. Percentage of people with disabilities using social media, by age and income
c. Percentage of people with disabilities using social media, by disability type
d. Comparison of percentage of people with disabilities using social media during emergencies with percentage of the general population

Evidence from studies conducted over the past decade indicates that people with disabilities demonstrate substantially lower rates of technology use than the general population.[6–8] These studies primarily focus on internet access via traditional desktop and laptop computers, particularly in the home, and place less emphasis on the use of other communications platforms/technology, such as mobile wireless technology. The Centers for Disease Control and Prevention (CDC) estimates that 36.5% of adults and 45.0% of children in the U.S. live in households that do not have a functioning telephone that is not a cellphone (i.e., they do not have a functioning "landline" telephone).[9] This growing trend of "wireless substitution" in the U.S. suggests that access to "computers" connected to the internet in the home may be becoming less critical for social and economic participation.

Survey research conducted by the Rehabilitation Engineering Research Center for Wireless Technologies (Wireless RERC) in 2012 and 2013 focusing on use of wireless technology by people with disabilities confirms lower levels of technology use by people with disabilities.[10] Still, the Wireless RERC survey data showed high rates of overall usage of mobile wireless devices, with 81% of respondents reporting that they own or use a wireless device such as a cellphone or smartphone, compared to 91% for the general population, according to the Pew Research Center.[11]

And this gap seems to be narrowing. The difference with the general population as reported by the Pew Research Center was substantially smaller (by only 10%) than those reported in earlier studies on computer and internet access (28% reported by Dobransky and Hargittai in 2006; and 31% t reported in the Kessler/NOD study in 2010). Furthermore, tablet ownership was approximately equal for Wireless RERC survey respondents with disabilities (31%), compared to the general population (34%) sampled by the Pew Research Center.[12]

Income, Education, Age and Disability Type

There is general agreement about the substantial impact of demographic variables, such as income, education, and age, on technology use by the general population and the population of people with disabilities. Further, specific disabilities have been shown to impact use of consumer technologies (e.g., deaf people generally do not use voice calling).

Burger et al show that younger age groups among Jersey Shore residents were more likely to use a range of communications technologies during and after Hurricane Sandy.[13] The annual American Red Cross surveys also show that younger and more educated individuals are more likely to use social media during disasters and emergencies.[14–16] Similarly, the Pew Research Center has shown that younger, more educated individuals and those with higher household incomes are more likely to use social media, the internet and cellphones.[11] Additionally, a 2013 U.S. Department of Commerce report based on Current Population Survey data from 2011 shows that rates of computer ownership, internet use, and broadband adoption in the home are directly related to family income and householder education, and inversely related to householder age.[6]

Among people with disabilities, younger and higher household income individuals have been shown to be more likely to use cellphones, smartphones, tablets,[17] and mobile internet.[18] But there has been little published research on how people with disabilities use social media in general, or specifically during emergencies.

METHODS

For this study, we collected data from November 1, 2012 through March 30, 2013 using convenience sampling to draw a sample of adults over age 18 with any type of disability. Minors under age 18 were not recruited due to concerns over conducting research with vulnerable populations. The protocol for this study was approved by the local institutional review committee at the grant recipient's home institution, as well as the subcontracting researchers' home institution. The questionnaire was made available in English and Spanish.

We recruited participants through the Wireless RERC's Consumer Advisory Network (CAN), a nationwide network of consumers with disabilities. The research team also engaged its internet and social media assets, including Yahoo! Groups, the Wireless RERC website, and its Twitter, Facebook and LinkedIn accounts. We asked our contacts among organizations that focused on disability issues at the national, state and local levels to disseminate the invitation to participate to their networks of people with disabilities. These organizations included Federal Emergency Management Agency (FEMA), the Federal Communications Commission (FCC), American Foundation for the Blind, Hearing Loss Association of America, American Foundation for the Blind, National Emergency Numbering Association (NENA), Telecommunications for the Deaf and Hard of Hearing (TDI),

Table 1. Percentage of respondents – by disability type, 2012–13.

Do you have difficulty with any of the following? (Check all that apply.)	Number of respondents	Percentage of respondents*
Seeing (blind or low vision, even when wearing glasses)	241	22%
Low vision	163	14%
Blind	78	7%
Hearing (deaf or hard of hearing, even when wearing aids)	485	43%
Hard of hearing	267	23%
Deaf	218	19%
Concentrating, remembering or making decisions	259	23%
Speaking so people can understand you	183	16%
Using your arms	151	14%
Using your hands and fingers	204	18%
Walking, standing or climbing stairs	513	46%

* Percentages add up to more than 100% because respondents were asked to check all that apply. Although some disability types naturally pair with others (e.g., deafness and difficulty speaking; using arms and using hands and fingers), these pairings are not always present.

Coalition of Organization for Accessible Technology, Shepherd Center, and others.

Respondents represented a range of disabilities, including hearing, vision, cognitive, mobility, dexterity, and speech limitations (Table 1). Further, respondents reporting vision or hearing impairment were asked to specify having either blindness or low vision, and being deaf or hard of hearing. Our experience conducting focus group research suggests that each of these subgroups may have distinct technology access and life experiences.

We collected data via the web, voice phone interviews, and in-person interviews. Of the 1,772 people who responded, 1,120 indicated that they had at least 1 of the disabilities listed in Table 1. Caregivers of people with disabilities were also recruited to complete the questionnaire. A total of 370 caregivers completed the questionnaire, 198 of them indicating that they also had a disability. Responses of the 172 caregivers without disabilities are not analyzed here. The age range of respondents with disabilities was 19–98, with a mean age of 52.18 and a standard deviation of 12.95.

Where possible, analysis of response data presented in this article has been weighted by income as reported by the 2011 American Community Survey (ACS). We downloaded ACS microdata from the Integrated Public Use Microdata Series (IPU MS), which is maintained by the Minnesota Population Center at the University of Minnesota.[19] Weighting by income helps mitigate possible biases toward recruitment of higher income respondents introduced by convenience sampling. This is especially important because of the focus on technology use, which has been demonstrated to be partially determined by income levels.

This weighting is used in analyzing data for all disability types listed in our questionnaire. Additionally, weighting by income is used for select disability types identified in the ACS database, which include 6 types: difficulty hearing (not disaggregated by deafness and hard of hearing); seeing (also not disaggregated by blindness and severe low vision); remembering, concentrating or making decisions; physical difficulties (walking, climbing stairs, reaching, lifting, carrying); performing basic tasks outside the home; and self-care inside the home.

RESULTS

Table 2 shows little overall difference in the general use of social media by people with disabilities in our Emergency Communications Survey and in the general population as measured by the Pew Research Center. Slightly less than three quarters of both groups of respondents use social media. Further, Table 2 shows that income is not a statistically significant factor in use of social media for either group. The percentage of respondents across the 4 income ranges for both surveys is generally consistent in the low- to mid-70% range.

In contrast to the similarities across income levels, age is strongly and significantly related to use of social media in both surveys ($p<0.001$ for our Emergency Communications Survey; the Pew Research Center also reports a significant relationship). Table 3 shows high rates of use by people with disabilities under 30 years old and in the general population, with progressively lower rates of use across the next 3 higher age ranges. Data on age and social media use are comparable in both surveys, with our survey showing higher levels of use in the older age ranges.

Use of Social Media and Other Media During Emergencies

The previous 2 tables focused on the use of social media in general, not necessarily during disasters and public emergencies. Our Emergency Communications Survey separately asked respondents how they received, verified (if at all) and shared (if at all) the *most recent* public alert they have received. The focus on the most recent public alert helps

Table 2. Percentage of respondents who use social media and online communities, by income.*

Emergency Communications Survey†		Pew Social Media Survey—2013‡	
Less than $35,000	75%	Less than $30,000	75%
$35,000–$49,999	72%	$30,000–$49,999	72%
$50,000-–$74,999	72%	$50,000–$74,999	74%
$75,000 or more	77%	$75,000 or more	71%
Overall	74%	Overall	72%

* The Pew Research Center reports income data in the ranges shown above. The Emergency Communications Survey asked respondents to indicate their annual household income by choosing from a list of seven income ranges. The lowest three ranges in our survey were collapsed to best approximate the ranges reported by Pew.

† Percentages reported for all respondents with at least one of the disabilities listed in Table 1.

‡ Percentage of internet users.

mitigates the possibility of respondents checking all or most of the options in a long list of media simply because at one time or another over an extended period they may have received, verified and/or shared alerts in these several ways. The aim of this particular formulation is to distinguish between more commonly and recently used communications media from those less commonly or recently used.

Additionally, we distinguished between receiving, verifying and sharing alert information as 3 distinct aspects of communication during emergencies. The act of verifying alert information points to the level of trust in particular communications media, a central concern with social media because of its ability to disseminate information to wide audiences. False reports abounded during and after Hurricane Sandy came ashore in 2012,[20] so much so that the Federal Emergency Management Agency (FEMA) created a webpage that identified and validated (or not) rumors about current emergency status.[21] Sharing information is also a distinct action that is fundamental to the social media user experience. Community-wide sharing of information on fast-moving events like disasters and public emergencies makes social media a potentially powerful tool for enhancing public safety through near real-time and highly localized updates. However, it also is the source of considerable concern over the dissemination of incorrect or outdated information.

Table 3. Percentage of respondents who use social media and online communities, by age.

	Emergency Communications Survey*	Pew Social Networking Survey 2013†
18–29	89%	89%
30–49	84%	78%
50–64	73%	60%
65 and older	58%	43%

* Percentages reported for all respondents with at least one of the disabilities listed in Table 1. Sample was weighted by income to match distribution of income for these age ranges in the American Community Survey sample for people with disabilities.

† Percentage of internet users who also use social media.

Table 4 shows the response data from the Emergency Communications Survey to 3 questions asking respondents to identify all the media used to receive, verify, and share information about their *most recent* public alert. Notably, social media ranks rather low for each of these actions, at percentages far below the rates of general use of social media for these same respondents.

These results are comparable to those from 2 other studies on communications during disasters and public emergencies. In Table 5, data for some of the items in Table 4 are redisplayed alongside data from the most recent survey on social media use during emergencies conducted by the Red Cross, and data from the 2013 study of two communities in New Jersey during and after Hurricane Sandy conducted by Burger et al. In this last study, the authors reported use of a range of communications technology for 2 different communities with different levels of income and racial/ethnic composition. The figures reported here are the averages for the 2 communities for the items that matched the question in our survey.

Use of Social Media During Emergencies—By Disability Type

Screen readers, voice command, speech-to-text, eye-gaze trackers, improved hearing aid compatibility, and custom configuration of interfaces are a few examples of the accessibility features of in-home and mobile information and communications technology (ICT). Yet access to rapidly evolving ICT is an ongoing challenge for users with disabilities. At the same time, disabilities like deafness and blindness can spur individuals to embrace technology more fully—and sometimes differently—than others.[22]

Table 6 shows the percentage of each of 5 disability types self-identified by respondents who received, verified or shared information via social media about the most recent public emergency possibly affecting them. The questionnaire asked respondents to select all disability types that applied to them from a list of 8. Three of those—walking, standing and climbing

Table 4. Methods of receiving, verifying, and sharing emergency alert information – All respondents with a disability.

	How did you receive the most recent public alert information?	How did you verify the most recent public alert information?	How did you share the most recent public alert information?
Television	49%	38%	—
Email	26%	12%	18%
Text message	27%	9%	22%
Sirens or other alarms	21%	12%	—
Phone call (landline, mobile phone)	20%	11%	26%
Direct observation of your surroundings	19%	24%	—
Internet news	18%	20%	—
Social media posting from public agency or personal network	18%	12%	13%
Radio	18%	12%	—
Direct contact with someone nearby	12%	15%	30%
NOAA Weather radio	13%	9%	—
App installed on smartphone	9%	5%	—
Instant messaging/chat	2%	3%	5%
Personal alerting device	2%	1%	—

NOAA, National Oceanic and Atmospheric Administration.
* Burger et al reported use of this information for two different communities with different levels of incomes and racial/ethnic composition. The figures reported here are the averages for the two communities.

stairs; using arms; using hands and fingers—correspond to the ACS disability category "physical difficulty," which is defined as: "a condition that substantially limits one or more basic physical activities, such as walking, climbing stairs, reaching, lifting, or carrying."[18] Consequently, response data for these 3 disability categories were combined for the analysis in Table 6.

Four of the 5 disability types—difficulty hearing, seeing, thinking, and physical difficulty—are weighted by total family income based on ACS data. The ACS relies on only 6 disability categories: the 4 functional disability categories mentioned immediately above, plus 2 activity-based categories (self-care and basic activities outside the home). Difficulty speaking is

Table 5. Methods of receiving emergency information: Results from three studies.

	Emergency Communications Survey: How did you receive the most recent public alert? (respondents with disabilities)	Red Cross: Which communication channels have you ever used to get emergency information? (general population)	Burger, et al: Where did you obtain information about your safety? (general population)*
	2012/2013	2012	2013
Television	49%	81%	50%
Email	26%	—	6%
Phone call (landline, mobile phone)	20%	—	5%**
Text message	27%	—	5%**
Radio	18%	64%	38%
Social media	18%	19%	17%
Internet/online news	18%	55%	25%
NOAA Weather radio	13%	19%	—
App installed on smartphone	8%	20%	—

NOAA, National Oceanic and Atmospheric Administration.
* Burger et al combine voice calling (on both cell phone and landline) with text messaging. Their single result is displayed for both "phone call" and "text message".

Table 6. Percentage of each disability group that received, verified, or shared their most recent public alert via social media.

	Hearing	Seeing	Thinking	Speaking	Walking, reaching, etc.
Received	21%	19%	19%	21%	15%
Verified	14%	12%	10%	15%	10%
Shared	12%	13%	16%	18%	10%

not an option in the ACS, and therefore cannot be weighted using ACS family income data.

The results in Table 6 show low use of social media for each of the 3 actions across all 5 disability types. Notably, those with speaking difficulties are consistently the most likely to use social media for all 3 actions. Those with physical difficulties are the least likely group to use social media across all 3 actions. However, the differences across all 5 disability categories are slight.

Results for those with vision and hearing difficulties can be further disaggregated by level of sensory loss: deaf and hard of hearing, and blind and low vision. The results in Table 7 show there is no significant difference in the rates of use of social media between people with low vision and people with blindness. Conversely, people who are deaf use social media at consistently and substantially higher rates than people who are hard of hearing.

DISCUSSION

The role of social media in emergency communications is still not well established. In part, this is a result of the nature of these media, which allow users in the community to send and receive mass communications easily. Concerns over accuracy and trustworthiness can be considerable among users in the community,[13] as well as among public safety and health officials.[23]

The data presented here show 4 specific results. First, use of social media in general is high for people with disabilities, as well as for the general population. Second, use of social media *during emergencies* is low for both groups. Third, levels of use of social media are not associated with income levels, but are significantly and strongly associated with age: younger people use social media at higher rates than older people in both groups. Fourth, differences in the use of social media during emergencies across disability types are slight. The only substantial and significant difference is between deaf and hard-of-hearing respondents, with the former more likely to have used social media to receive, verify and share emergency information.

These results show that people with disabilities as a group behave much like the general population in use of social and other media. Levels of social media use by people with disabilities are similar to those of the general population as documented by the Pew Research Center, the American Red Cross, and by more targeted studies like that conducted by Burger, et al.

High percentages of people with and without disabilities use social media for everyday communication. This behavior suggests that effective emergency communications strategies should include social media both for posting official alert information and for monitoring traffic originating in the community.

However, a robust system should include other media and community outreach efforts to maximize public awareness and safety across the entire community. At the current time, use of social media in emergency situations is secondary to more established broadcast media, especially television. As these media continue to evolve, relative use patterns are likely to change, warranting additional study.

LIMITATIONS

The primary limitation of this research was the reliance on convenience sampling of the disability community. It prohibited estimating the confidence intervals and confidence levels of the sample and subsamples. Unfortunately, techniques such as random digit dialing and supporting strategies for random selection are problematic when reaching people with disabilities, especially those who may have hearing, speech, or cognitive limitations. Nevertheless, our results are comparable to other survey research in the area of technology use during disasters and emergencies, especially with the Pew Research

Table 7. Percentage of respondents with vision and hearing loss received, verified, or shared most recent public alert via social media.

	Difficulty seeing			Difficulty hearing		
	Low vision	Blind	Chi-square p-value	Hard of hearing	Deaf	Chi-square p-value
Received	21%	15%	0.264	15%	27%	0.002
Verified	15%	9%	0.212	11%	17%	0.092
Shared	15%	15%	0.893	8%	15%	0.007

Center, American Red Cross, and more targeted studies like that conducted by Burger, et al.

Weighting the response data by ACS annual family total income data in order to correct potential biases introduced by convenience sampling has limits. First, the most recent ACS microdata available are from 2011. Our survey, however, was conducted in fall and winter 2012–2013. Second, the ACS includes only a limited set of disability types, which prohibits weighting for other disability types of interest, including blind, low vision, deaf and hard or hearing types. Our experience tells us that blind and low-vision individuals have different experiences using technology, and that deaf and hard-of-hearing individuals belong to entirely different cultures. Consequently, it would have been useful to have income weights for the population of people with these specific disabilities.

Additionally, we asked respondents about their use of a wide variety of media, but only for the most recent instance in which they received any alert or notice, not for disasters and emergencies in general. This helps to sharpen the focus on recent use patterns, while forfeiting insight into the various communications media people with disabilities generally might access during any disaster or emergency. Use of a specific medium on a specific occasion can result from a range of factors, including availability of voice or data networks, specific location of the individual respondent (in the home, outside, etc.), or nature of the specific emergency.

CONCLUSION

There does not seem to be a "disability divide" in the use of social media between the population of people with disabilities and the general population. However, there do seem to be slight variations between and among disability types, e.g., people with speech limitations and those who are deaf use social media during emergencies at higher rates than other disability types. People with physical limitations use social media least. Additionally, there is an age divide in both populations, with younger people using social media considerably more than older people.

Further, there seems to be a trust gap concerning information about public emergencies received via social media. Television is still the most-used medium for information regarding public emergencies. Social media are used for gathering emergency information by a relatively small percentage of the population, much smaller than the percentage that has access to social media. As a consequence, public safety and health authorities need to ensure that social media are complemented by other components of a comprehensive communications plan.

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Can Social Networking Be Used to Promote Engagement in Child Maltreatment Prevention Programs? Two Pilot Studies

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Introduction: Child maltreatment is one of the United States' most significant public health problems. In efforts to prevent maltreatment experts recommend use of Behavioral Parent Training Programs (BPTs), which focus on teaching skills that will replace and prevent maltreating behavior. While there is research to support the effectiveness of BPTs in maltreatment prevention, the reach of such programs is still limited by several barriers, including poor retention of families in services. Recently, new technologies have emerged that offer innovative opportunities to improve family engagement. These technologies include smartphones and social networking; however, very little is known about the potential of these to aid in maltreatment prevention. The primary goal of this study was to conduct 2 pilot exploratory projects.

Methods: The first project administered a survey to parents and providers to gather data about at-risk parents' use of smartphones and online social networking technologies. The second project tested a social networking-enhanced brief parenting program with 3 intervention participants and evaluated parental responses.

Results: Seventy-five percent of parents surveyed reported owning a computer that worked. Eighty-nine percent of parents reported that they had reliable Internet access at home, and 67% said they used the Internet daily. Three parents participated in the intervention with all reporting improvement in parent-child interaction skills and a positive experience participating in the social networking-enhanced SafeCare components.

Conclusion: In general, findings suggest that smartphones, social networking, and Facebook, in particular, are now being used by individuals who show risk factors for maltreatment. Further, the majority of parents surveyed in this study said that they like Facebook, and all parents surveyed said that they use Facebook and have a Facebook account. As well, all saw it as a potentially beneficial supplement for future parents enrolling in parenting programs. [West J Emerg Med. 2014;15(5):575–581.]

INTRODUCTION

With approximately 3.6 million children referred for suspected maltreatment each year, child maltreatment (CM) is one of the United States' most significant public health problems.[1] The consequences of maltreatment range from impaired brain development and behavioral problems to low academic achievement and mental health problems later in life.[2,3] These consequences impact our society at a large price, with estimated financial costs at $103.8 billion.[4]

To prevent maltreatment from occurring, and also prevent its reoccurrence, experts recommend behavioral parent training programs (BPTs) which focus on teaching skills that will replace and prevent neglectful or abusive behavior.[5–7] While there is research evidence to support the effectiveness of several

BPTs (e.g., SafeCare®, Triple P, Parent Child Interaction Therapy, Incredible Years) in maltreatment prevention, the reach of such programs is still limited by a number of barriers, including lack of dissemination of such programs and poor engagement and retention of families in services. Current research indicates attrition rates between 20% and 67% for parenting programs, even among home-based programs[8–10] and among parents who are mandated to services by child welfare systems.[11]

Technology has been identified as a potentially effective means to reach clients, help engage them, and augment or replace sections of face-to-face intervention programs to increase reach but also reduce cost.[12,13] Technology provides interventionists new opportunities to increase engagement in a number of ways across the social ecology. The most commonly studied technologies to date in CM prevention include television and DVD media,[14,15] Internet;[16–18] telephone,[19] and text messaging.[20] Over the last decade, however, newer technologies have emerged that offer innovative opportunities for client reach and intervention enhancement. These technologies include smartphones and tablet applications, including social networking applications such as Facebook. However, little is known about the potential of these to aid in maltreatment prevention efforts, including information about their appeal and accessibility to at-risk parents.

Smartphones and tablets provide an abundance of opportunities to instantly interact, play games, send messages, send and watch videos, edit and send photographs, communicate with large groups of one's choosing through messages and pictures, and get notifications of upcoming activities all in one small handheld device. According to a June 2013 report by Pew Research Center,[21] 91% of the adult population now owns some kind of cell phone and 56% of American adults are now smartphone users, and smartphone use has steadily increased across demographic groups since 2010.[21] Young adults are the most likely to be smartphone owners (79% among 18–24 year olds, 81% of 25–34 year olds); those same groups are most likely to receive child welfare services. Projections of smartphone use suggest increase growth across socioeconomic strata.

Online social network tools (e.g., Facebook, Instagram) accessed via smartphone are becoming increasingly common. Pew Research data show broad use of social networking apps across demographics, with 71% of women, 68% of black, 72% of Hispanic, 72% of those with income below $30,000, and 61% of individuals who live in rural areas using social networking technology.[21] Within the field of mental health and health behavior change, online social networks are slowly becoming popular avenues for health communication and health promotion.[22] While no quantitative studies have yet examined the relationship between use of social networking apps, behavior change, and parent interventions, they are now being studied in other areas of health behavior change. For example, online interventions using a social network-type format have been found to help increase social support for individuals with coronary heart disease,[23] promote sexual health,[24] increase social interactions in youth with disabilities,[25] and reduce psychological stress.[26] Given the promise of these new technologies, questions remain about the functional utility of such technologies within the maltreatment prevention populations we serve. After all, these technologies can only improve outcomes if families are willing and able to use them. The current pilot study was designed to help address some of these questions.

METHODS

This paper reports on 2 pilot projects. The first project gathered initial data from parents and providers on the use of smartphones and online social networking technologies by at-risk parents. The second project consisted of a pilot study in which 3 parents completed behavioral parent training that had been augmented by a computer-administered social networking enhancement (i.e. a private Facebook group).

Project 1 – Parent and Provider Surveys

Survey Participants

Parent Participants. Participants included 12 parents with children under age 5 who were recruited from 2 community-based organizations that serve at-risk children in a high violence, urban area of a large southeastern city. The first of the 2 referring agencies was a hospital and university-affiliated agency that provides comprehensive pediatric care for at risk families. The second referring agency provides child care, education, and comprehensive support services to families of various income levels within the metro area. Parents who participated in the study were either referred to the project by a Behavioral Health Coordinator who worked for the agency, or were approached at the agency by research staff. Because of these recruitment methods, no information is available on the percentage of participants who were approached but declined to participate. Inclusion criteria for the parents included that the parent must be age 18 or over, the biological or custodial caregiver of a child between 0–5 years old, and reside in the home with the target child. Exclusion criteria included an inability to communicate in English, cognitive impairment, or an inability to understand the consent form. Analysis of demographics for parents participating in surveys yielded that parents had an average of 2.4 children (range 1 to 4); an average household size of 4.25 individuals (range 3 to 6); an average monthly income of $1,360 (range 0 to $2,600); 67% of parents were single (8% were divorced, 25% were married); 67% were unemployed (33% employed); and 100% of parents were African American.

Provider Participants. Six providers who serve parents with a history of or risk factors for CM were also surveyed for the project. Providers were recruited from staff at the above described Georgia agencies, as well as through an additional agency in Oklahoma City that provides SafeCare®. Of the participating providers, 2 typically provided services to families living in rural areas, 1 provided services to families living in an urban area, and 3 provided services to families who lived in a combination of rural and urban areas. Providers indicated serving families with multiple risk factors including low income, single parents with multiple children, and parenting substance use and mental health problems.

Survey Materials and Procedure. Once a parent or provider expressed interest in participating, they were contacted by a member of the research team to describe the project and schedule a survey. Verbal consent was obtained from each participant prior to initiating the survey. All parent surveys were administered by project research staff in person or by phone at a time that was convenient for the parent. Questions focused on parents' use of computer, use of cellular phones, participation and attitudes towards social networking, and attitudes regarding participation and engagement challenges in parenting-related services. All provider surveys were administered through a secure online web-based survey system. Parent and provider surveys took approximately 25 minutes to administer. Parent respondents were reimbursed with a $20 gift card and provider respondents were reimbursed with a $25 gift card.

SURVEY RESULTS

Parent Results on Computer and Cell Phone Use

Findings from the study were generally consistent with Pew Research.[21] Specifically, 75% of parents surveyed reported owning a computer that works. Further, 89% of parents reported that they had reliable Internet access at home, and 67% of respondents said that they used the Internet daily.

Of the parents surveyed, all reported owning a cell phone, and 92% reported using it daily. Two-thirds (66%) said they had a smartphone, and 92% reported having Internet access via their phone. All parents reported using their phone for texting on a regular basis. Sixty-seven percent said that they send pictures to friends with their phone, and 33% said that they send videos to friends with their phone.

Provider Results on Computer and Cell Phone Use

Providers' observations of computer use within homes differed to some degree from parental reports. Of the 6 providers surveyed, 4 reported seeing working computers in families' homes less than 25% of the time.

Compared to relatively infrequent observations of working computers in families' homes, providers reported observing much greater use of cellular phones with the parents they serve. Four of six providers reported that >75% of their at-risk families had a cellular phone that they regularly used. Further, providers said that that they regularly (i.e. >75% of the time) saw parents do things other than talk on the phone, such as text or send pictures to friends. Consistently, 4 of the 6 providers said that they regularly see "smartphones" in families' homes.

Parent Results on Use of Social Networking

When asked about their knowledge of and attitudes towards social networking, and Facebook in particular, 75% of parents said that they like Facebook, 8% said they didn't like it, and 17% said they were not sure. All parents surveyed reported that they have a Facebook account and use it, with a quarter using it daily, 50% using it weekly, and a quarter using it monthly. Responses to open-ended questions yielded that parents perceived Facebook as a good way to interact with old friends, to network with others, and to potentially find jobs and resources for their family.

Provider Results on Use of Social Networking

All providers believed that their client base was familiar with Facebook. Providers gave some anecdotal descriptions of parents' Facebook use, both positive and negative, including parents airing their anger on Facebook and having negative repercussions from friends, parents meeting new friends on Facebook, keeping up with family and friends' photographs, and sharing helpful information and recipes on Facebook.

Parent Perceptions Regarding Reach and Engagement in Services

Open-ended survey questions were asked to assess parents' perceptions of family engagement difficulties. Most parents responded that they perceived engagement of families to be difficult because of logistical factors, including difficulty finding the time to schedule the appointment, sessions being too long, and difficulty with transportation to the service setting. One parent commented that she thought parents worry that their children's bad behavior will be blamed on them if they participate. Other parents commented on privacy-related concerns (e.g., "not wanting people in their business").

Provider Perceptions Regarding Reach and Engagement in Services

Providers' reports of family engagement difficulties focused on family stressors that interfered with parental engagement, including parents' lack of time due to holding several jobs, working odd hours, and having a generally busy schedule. Providers also commented that families seem "put-off" by programs that seem "cookie-cutter," caseworkers who come across as punitive, and case plans that are focused on things the parent has done wrong. Several providers also commented that lack of parental motivation was likely a contributor to engagement difficulties. When asked what providers should do to best overcome these challenges, providers commented that they felt it was important to spend time building good rapport with families, help link families with resources to show that they care, give families tools to help them be less stressed, demonstrate a demeanor that is not judgmental or criticizing, and overall treat the family with respect and honesty.

PROJECT 2 – BRIEF INTERVENTION WITH PARENTS

Brief Intervention Participants

Three of the parents surveyed participated as brief intervention participants. The 3 brief-intervention parent participants were single, African American mothers living in the metro Atlanta area. All 3 of these parents said that they had consistent Internet access either through a home computer or through a nearby library. They had an average of 1.6 children and an average monthly income of $1,200.

Intervention Materials and Procedure

Following completion of surveys, 3 brief intervention parents received a social networking-enhanced brief intervention over the course of a 3-week period. Parents received a $20 gift card for each session they attended. A graduate assistant interventionist delivered SafeCare® services (Parent-Child Interaction [PCI] components only), receiving training and supervision from the first author using the standard SafeCare® training protocol.[27] In Session 1, parents were provided a unique username and password and were enrolled in a private SafeCare Facebook group online. Parents were taught how to use all relevant functions of Facebook on a computer and for participation in the group. The interventionist asked parents to demonstrate several skills during this session, such as checking messages, posting messages to individuals and the group, checking the resource page, and posting pictures. Provisions for participation in the group were also discussed and provided in writing during this session, including content that was allowed and not allowed to be posted on the group site, the right of the principal investigator (PI) and interventionist to remove any content not deemed consistent with the goals of the project, and the requirement of participation in the SafeCare® case studies to be a member of the group. The interventionist then conducted a modified version of Safe Care®'s PCI module[28] in parents' homes during 3 weekly sessions for the duration of 3 weeks. Outside of the sessions, parents participated in the Facebook group that included daily communications by the interventionist about SafeCare®-related skills, posting of favorite parenting websites and links to articles, and positive feedback about others' postings. At the end of each session, surveys were conducted with each parent to evaluate the perceived ease of use of the Facebook group, ability to post messages and pictures, comfort posting messages and pictures, ability to connect with others socially, and any other perceptions of the Facebook component of the intervention.

Intervention Analyses

We employed a process consistent with thematic analysis [29] to evaluate parent survey responses. First, the PI read through all of the parents' surveys several times and wrote notes and marked ideas from the narratives. Second, the PI searched for themes among the responses that represented coherent patterns and re-read the data to ensure limited overlap between themes. The themes discovered through this process are discussed in the results section below.

BRIEF INTERVENTION RESULTS

Given that the primary objective of the brief intervention was to pose a scenario in which to evaluate parents' use and perceptions of a Facebook enhancement to a parenting program, limited information was collected about parents' acquisition of PCI skills as part of the abbreviated SafeCare® components. In general, however, parents reported that they enjoyed participating in the SafeCare® component of the intervention. Homework and skill acquisition was variable among parents, as 1 parent reported being frequently out of town in-between sessions, and thus had "limited opportunity" to practice the skills being learned. The other 2 parents reported enjoying learning about the skills and practicing using them. All 3 parents reported that the PCI skill-building component of the intervention helped them gain more awareness of the skills they often use and don't use with their children at home. All parents self-reported increases in their use of praise (e.g., high-fiving their children, saying "thank you"), giving choices, and talking while interacting with their children. At the end of the brief intervention, all parents also reported feeling the need for continued practice, particularly in the areas of ignoring minor inappropriate behavior and using rules and consequences consistently.

All brief intervention sessions concluded with a parent interview to evaluate parent use of the Facebook group, likes of the group, dislikes, and suggestions for improvement. Participation rates in the Facebook group were moderate. More specifically, the 2 parents that had computers in their homes reported checking the Facebook group regularly, and reported, on average, checking the Facebook group page 3 times weekly. One parent had to check the Facebook group from the library and her participation was more variable, as she participated in the Facebook group some weeks but not others.

Most feedback generated during interviews indicated positive responses about participation in the Facebook component of the intervention. Overall, parents reported that participating in the group was very easy, as the Facebook functions were intuitive. One parent expressed some difficulty finding other group members through the Facebook "Friend" search function. Content that parents posted to the Facebook group included links to helpful websites and parenting articles online. Parents said that they were careful to only post content that was appropriate for and they felt comfortable sharing with an anonymous group. They also felt that it would be important for other parents to do the same. Parents also commented on the content that they enjoyed viewing (of others' postings) within the group, including parenting resources, links to websites, and supportive comments to and from other parents. In general, parents felt that participation in the group would be a good way to engage future participants in the parenting program, especially given that the typical SafeCare® intervention length is 18 weeks.

During interviews, parents also made suggestions for future changes or additions to the Facebook group. Two parents suggested inclusion of Facebook "events" and incentives where parents can get raffle tickets and win prizes to increase motivation for participation. Parents also said that they would enjoy having more contact with their home visitor through Facebook, either through direct messages, group messages, or instant chats. A parent also commented that it would be helpful to see more examples of the skills parents are practicing at home, and they would like for home visitors to post videos of the skills on Facebook to show examples. Inclusion of themes (e.g., Money Saving Monday, Wellness Wednesday) was also mentioned as a way to add structure to the group. In general, parents reported enjoying being connected with other parents, though within the 3-week intervention period most postings were to the group and not directed individually to other parents. Related, a parent commented that she would enjoy the opportunity to see more similarities between herself and other parents participating in the group (e.g., similar-aged children, similar geographic locations). Parents also commented that the group would be more fun and engaging with a larger number of participants than 3.

DISCUSSION

The goals of this study were to learn more about at-risk parents' use of smartphones and online social networking technologies and to test a social networking enhancement to a brief behavioral parenting intervention. Our survey findings indicated that smartphones, social networking, and Facebook, in particular, are being used by individuals interviewed who represent a range of demographics and individuals in minority ethnic groups. This is consistent with Pew research data that tell us that younger adults—regardless of income level— are now very likely to be smartphone owners and 72% of online adults now use social networking sites. In this study, the majority of parents had favorable attitudes toward Facebook, and all reported using Facebook, and believed it could be a beneficial supplement to a parenting program.

The potential of new technologies to increase frequency of communication, provide stimulating and engaging means of communication, and make communication with home visitors easier are now beginning to be demonstrated through research. University of Kansas researchers [20,30] found that mothers receiving regular text messages via cell phone when participating in a parenting program demonstrated increased engagement, decreased parenting stress, and increased use of positive parenting strategies than mothers receiving the same program without texts. Given the enhanced capabilities of smartphones, which were not available at the time this study was conducted, it could be postulated that these positive findings could be further enhanced by smartphone and social networking use.

Indeed, a number of new opportunities are available for smartphones and social networking technologies. Both of these innovative technologies offer a number of exploratory avenues to help facilitate technological adaptations in a field that has generally lagged behind other areas of health. More specifically, within maltreatment prevention, social networking, smartphones, and tablets can help reach new populations (e.g., communicate with rural families), increase family engagement through non-traditional forms to increase interest, remind parents of appointments and/or homework assignments, and use nontraditional methods to teach home visitors and parents new skills (e.g., video chat instead of in-person sessions, "app"-based games or interactive activities). Additionally, these technologies are appealing to young adults, which are often the target of home- visiting interventions.

LIMITATIONS

Although the current findings are encouraging regarding the use of smartphones and social networking technologies, several limitations exist. First, the study used a small sample size, and given the qualitative nature of the analysis, the findings are not generalizable. Future studies would benefit from addressing these limitations and incorporating standardized measures that would allow for quantitative data analysis and examination of group comparisons, examination of parental skill acquisition, and examination of the way in which social networking is used by parent participants (e.g., how to parents connect with each other, how do they connect with the group, what frequency of communications correlates with results). Further, while there may be benefits of social networking, potential difficulties have been of concern to some researchers, clinicians, and university ethics boards. Similarly, some concerns were echoed in the survey and brief intervention feedback. Parents commented on the importance of "revealing information that is appropriate for the setting." Providers surveyed also commented on times when they had observed parents "airing their anger on Facebook" and making statements that "provoked negative repercussions from friends." Consistently, ethical discussions among clinicians about Facebook and social networking, while recognizing its benefits, have expressed concerns about potential breeches to Health Insurance Portability and Accountability Act rules, iatrogenic effects of parents who may make negative comments to a social networking group, losses to confidentiality that parents may incur unintentionally, and parents who may inappropriately use Facebook to air crisis and safety-related information. Thus, while online social networking offers an avenue of opportunity for enhancement of social service programs, inherent difficulties must be considered when designing adaptations.

CONCLUSION

The growth of smartphone and social networking technology reveals a number of new opportunities to address engagement-related dissemination difficulties in child welfare. When considering the integrated theory of parent involvement framework,[31] social networking has the potential to improve parental involvement among individual, provider, programmatic, and neighborhood levels, including increasing individual motivation and engagement, allowing an interventionist to connect with parents more frequently, and connecting parents with one another and in turn helping them feel less socially isolated. Thus, while much needs to be learned about policies and training procedures that will protect client's best interests, it appears that the benefits of technology-enhanced interventions have the potential to far outweigh the costs. This serves as rich area for future study.

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Mitigating Concerns and Maximizing Returns: Social Media Strategies for Injury Prevention Non-profits

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Injury prevention programs can use social media to disseminate information and recruit participants. Non-profit organizations have also used social media for fundraising and donor relationship management. Non-profit organizations (NPOs) with injury prevention missions often serve vulnerable populations. Social media platforms have varied levels of access and control of shared content. This variability can present privacy and outreach challenges that are of particular concern for injury prevention NPOs. This case report of social media workshops for injury prevention NPOs presents concerns and strategies for successfully implementing social media campaigns. [West J Emerg Med. 2014;15(5):582–586.]

INTRODUCTION

Non-profit organizations (NPOs) have used social media to develop relationships, disseminate information, and fundraise.[1–2] Researchers have used social media to target hard-to-reach populations,[3–5] and public health campaigns increasingly use social media to diffuse information.[6–8] Injury prevention outreach could benefit similarly from using social media for information diffusion, public relations, and donor development[–].[10] A 2010 study of social media diffusion among public relations practitioners in health departments found that just 17 percent use social networking sites,[11] suggesting untapped potential for social media expansion.

Using social media to develop donor relationships can increase an NPO's sustainability and profitability. M+R Strategic Services tracks electronic marketing and fundraising from a large sample of U.S. NPOs. Their 2013 report finds a downward annual trend in donations from email solicitations, which remains the preferred media fundraising tool among NPOs.[12] During the same reporting year, median monthly giving from social media efforts increased. In particular, health NPOs saw a 12% increase in online donations in 2012 over 2011. Taken together, NPOs are seeing lower returns from email fundraising campaigns and greater usage of social media from constituent target audiences. This raises questions about how NPOs can integrate social media without increasing the risk inherent to increased scale of public engagement. This case report presents tactics for maximizing the potential of social media while mitigating its risks. The aim of the report is to present concerns from NPOs that provide injury prevention services for vulnerable populations and to present organizational tactics that address them. The findings are drawn from 2 social media training sessions conducted for Georgia NPOs in 2013. The workshop was promoted to the funding agency's grant recipients as a training to use social media for organizational sustainability. Grantees were not compensated for their participation, but there may have been a willingness to participate to signal to a critical funder their commitment to sustainable management practices. All of the attendees were from NPOs with injury prevention-related missions. Eighty percent of the organizations focused on domestic violence interventions. Participant observation and pre- and post-workshop participant surveys found that there are social media concerns specific to NPOs that serve vulnerable communities: privacy and authorial content control. Developing clear social media protocols and targeted use of social media tools can minimize these risks. Workshop participants reported that developing a social media strategy gave organizational actors greater confidence with tools, a clearer organizational structure for campaign management, and increased awareness and donations.

CASE REPORT

Participants in the social media training sessions were from a diverse group of NPOs in the state. They spanned small, community-based organizations to non-profit auxiliaries of major medical and university centers. Workshop participants included executive leaders, marketing coordinators, donor management professionals, and administrative assistants. Participation in both sessions was voluntary, although most participants were recipients of a grant from a state agency. There were 41 participants representing 27 different organizations. Over 80% of the participants focus on domestic violence prevention and services (n=22). The remaining NPOs offer foster care services, teenage pregnancy, and community health programs.

Privacy and control of messaging emerged as 2 primary concerns. Both concerns were addressed through the "see us in action" exercise. Posting photographs can be a very effective tool in raising awareness with a social media campaign. Images have greater viral potential than text alone.[12] Viral online content refers to an image, video, advertisement, etc. that is circulated rapidly on the Internet. A viral message can lower the cost of information diffusion for NPOs by lowering the expenditure to potential donor ratio. Sharing images of successful community events can also evoke an emotional connection with current and potential donors. However, the virality of photographs coupled with low platform controls (e.g., "tagging" photos feature on Facebook) can pose a safety risk to vulnerable constituents, e.g., domestic violence victims.

The facilitator used a Facebook and Twitter account created for the workshop to model how photographs and location information could be shared differently, considering privacy risks and audience. Using a cellphone camera, the facilitator snapped a photograph of the participants as they were brainstorming earlier in the workshop. The image conveyed that the event was well attended; the audience energetic, and the financial support for the event was justified. The photograph was a good example of allowing donors to see their investment in action. However, participants noted that the photograph clearly showed their faces and, in some instances, their name badges. Additionally, photographs taken with smartphones can have location data embedded in the file. They realized that an image intended to market a successful event could inadvertently release sensitive participant information.

This tension between maximizing the returns to social media with concerns about safety risks for NPOs and their constituent members and audiences can be navigated with a better understanding of content controls and platform differences. Twitter is a micro-blogging website that posts 140-character "posts" to followers. Twitter can be either asynchronous or synchronous, depending on how a Twitter user chooses to engage followers and other users. Content on Twitter moves fast and through rapid sharing mechanisms in the platform can easily be stripped of its context and originating source. Additionally, Twitter has only one level of content control. A user can be public or private. A public Twitter account better harnesses the message dissemination potential of the platform but also poses the greatest risk to NPOs with risk-adverse missions.

In contrast, the other largest social media platform, Facebook, can also be either asynchronous or synchronous. Posts can be longer and different types of content, such as surveys, graphical images, and even documents, can be uploaded to Facebook posts. Facebook posts are still relatively easy to share, increasing the viral potential of messages, but it is more difficult to strip posts of contexts or original sources. Additionally, Facebook offers a comparably vast array of privacy settings at the individual level (for each post) and at the account level. Because of these controls, media researchers consider Facebook's platform a digital plug into pre-existing networks. Content shared on Facebook is more likely to travel through and engage with existing networks that have met privacy setting criteria, usually because of a pre-existing relationship. Although we often speak of social media as a single entity, there is considerable variation in how platforms are designed to capture, disseminate and preserve the intent of user content. NPOs should consider what content it shares within the context of the level of control, message intent, and outreach goals. The following chart outlines potential, risks, and considerations for content across 2 of the major social media platforms. (I include Facebook and Twitter in this analysis. However, while there is a range of other social media tools increasingly adopted by organizations (e.g. Pinterest, Instagram.), these platforms do not differ significantly in form or concerns from Facebook and Twitter, which remain the largest and most-used social media platforms.) (Table 1)

The participants were guided through a 4-stage process designed to reveal the tensions of social media platforms and design strategies to mitigate them:

1. A photograph of the event was shared on a projector. The participants brainstormed how images of faces and name badges might impact vulnerable groups that use their services.
2. In pairs, participants used Facebook and Twitter accounts established for the exercise to explore different privacy controls.
3. Participants assessed how social media engagement would benefit their organizational missions.
4. Each participant drafted social media protocols to address organizational structure, content guidelines specific to each social media platform, and contingency plans for role transition.

DISCUSSION

Despite initial and emerging concerns about privacy and learning curves, all of the participants hoped that social media could increase donations, and for good reason. High-profile

Table 1. Comparison of controls, concerns and tactics between social media platforms.

Platform	Content length	Privacy controls	Concerns	Tactics
Twitter	140 characters maximum (can be extended by linking to external websites.	One control at account level: Private or Public	Content, quickly shared, can lose context.	Use Twitter to engage non-profit organizations with similar missions. Do not share images that could reveal sensitive participant information (e.g. faces and locations).
Facebook	Up to 1000 characters with variation by content type (e.g. uploaded documents and images)	Multiple controls at the individual post level and account level.	Social media campaigns that benefit from broadest possible awareness (e.g. new donor relationships) content limited to existing networks is self-defeating.	Use Facebook for more sensitive content (e.g. photos can be limited to members only and "downloading" and "sharing" options can be de-selected).

social media campaigns like a 2012 drive by For Love of Children helped the organization fundraise $114,000 in 1 business day. While that is likely an outlier, social media can increase donor participation in 2 ways. One, it can lower the barriers of participation with online payment tools like PayPal, which minimize the number of decision points a donor must make to complete the donation cycle. Two, social media can indirectly impact donations by raising awareness of an organization and its mission among likely donors.

To achieve either of these goals (and organizations should ideally aim to achieve both), research finds that NPOs should interrogate their organizational structure. Georgetown University's Center for Social Impact Communication conducted a nationally representative survey of how social media has influenced how adults engage with social issues.[14] The study concluded that social media users develop donor relationships with organizations at multiple points of entry, often simultaneously and not in a successive order from low engagement to high engagement. This model is at odds with traditional donor relationship organizational structures in NPOs. These models assume that donors progress successively from awareness to low engagement through financial involvement. NPOs generally understand each level of participation as discrete. The donor relationship manager role, wherein donor relationships are cultivated over time, emerges from this organizational model of donor engagement.

The Georgetown report's findings do not suggest that NPOs abandon traditional donor relationship activities. However, they do suggest that a diverse portfolio of engagement activities is better matched to changes in donor behavior. Likely donors who use social media appear to do so with variable levels of engagement that "doesn't stop and start with discrete levels," suggesting for NPOs "it's actually preferable for people to be engaged on multiple levels."[15]

To inculcate engagement on multiple levels, NPOs must consider carefully their existing organizational structures. Fewer than 10% of the workshop participants had integrated its social media initiatives across organizational levels and roles. The most common organizational structure was the "lone ranger" model. In this model, a single organizational role is responsible for social media management. Larger NPOs had hired specifically for this role while smaller NPOs primarily relied on interest from an employee to assign social media duties. The lone-ranger model presents 2 concerns for using social media effectively. First, the model assumes that donors are engaging at discrete levels. That assumption runs counter to research. Second, this model presents challenges for sustainable online fundraising initiatives and social media protocols. Employee turnover, including promotions or realigning tasks and roles, can derail a successful social media campaign if the entire process resides with 1 person or job role.

To counter this problem, participants worked in pairs to write a social media protocol. The protocol assessed the NPO's current organizational structure, identified all donor relationship and outreach activities for each role, and defined current social media engagement. Three quarters of the participants reported that only 1 staff member knew social media account passwords. One participant remarked that when she was hired to manage social media, she had to deactivate all of the organization's social media accounts because the former employee responsible for them was the only one with access. This kind of misappropriation of information can disrupt social media effectiveness.

Social media protocols should diffuse responsibility for social media engagement across several organizational roles. Responsibility diffusion increases campaigns' sustainability by minimizing account discontinuity from employee turnover and leaderships changes. By incorporating various organizational stakeholders, responsibility diffusion also increases organizational buy-in of social media campaigns. Protocols should also explicitly state appropriate tone and content for various social media platforms. As participants learned from

Table 2. Tools for efficiently managing social media campaigns.

Online Donations	Account Management	Analytics
PayPal Razoo Causes	Tweetdeck: manage multiple twitter accounts from one platform	Hootsuite: Track content reach and life course
	Hootsuite: Manage multiple social media accounts across different platforms from one account; pre-schedule posts en masse	Archivist: Collect tweets related to specific social media campaigns, archive for network analysis of ROI and reach

ROI, return on investment.

the photograph exercise, all content is not appropriate for all platforms. And, misalignment between content and platform can expose NPOs to privacy-related risks. Committing these guidelines to paper and sharing them with all organizational actors minimizes risk.

Responsibility diffusion also creates a mechanism to integrate social media campaigns with existing marketing and outreach initiatives. Social media integration addresses the challenges of donor relationships that increasingly operate across multiple levels simultaneously. For example, appending all email signatures in an organization with a hyperlink to an online donation page maximizes multiple points of donor engagement.

Social media protocols are also a primary tool for mitigating concerns about social media usage. Workshop participants explored the architecture of each social media platform and designed a protocol specific to each. The consequences for the "see us in action" photograph exercise illustrate the importance of protocols for risk management. During the workshops, participants considered if the image taken during the event would be appropriate for Twitter. Twitter allows only 2 privacy settings: private and public. A private Twitter account prevents a user's 140-character messages ("tweets") to be viewed by any registered or unregistered Twitter user. This is attractive to organizations with privacy concerns. However, if an organization is using Twitter to increase awareness, a private account can be self-defeating, as engagement with the account requires pre-existing knowledge of it. As the virality of Twitter is one of its greatest attributes, this may not be ideal. When participants considered posting the same image to the group Facebook account, they realized the appeal of Facebook's various privacy settings. Facebook allows a user to control the privacy of the overall account and the privacy of each post. A social media protocol would consider these platform strengths and weaknesses to provide guidance on posting an ostensibly innocuous photograph to the right medium, with the right level of privacy controls.

This additional level of control assuages some concerns about privacy that were raised by the photograph exercise. But, there are other tactics that reconcile the tension between serving vulnerable populations on the one hand and maximizing social media's relationship building and fundraising potential on the other. One tactic is called "object messaging." In the case of the photograph, the goal was to capture a successful event in hopes of eliciting an emotional connection with social media users. The tension arose from photographing persons. The same goal can be achieved by photographing non-human subjects. The facilitator modeled this by taking another picture taken from behind the participants as they faced the projector screen. The optics captured the same energy of the first photograph but neutralized concerns about identifying participants. Clear social media protocols should include guidelines on what content is appropriate for which social media platform. NPOs should consider the potential risk of releasing sensitive information or images of participants (particularly of minors). But, as in the case of object messaging, deliberate engagement can mitigate most NPO concerns. Social media content is best suited for a "bird's eye" view of campaigns, engagement with public discourse, and profile awareness. Fortunately, all of these best practices allow NPOs to harness the potential of social media for volunteer and donor relationship development.

Integration and social media protocols increase the efficacy and efficiency of social media campaigns. There are 2 primary ways that injury prevention NPOs can use social media specifically for fundraising. There is the broadcast method and the engagement method. The broadcast method leverages online fundraising campaigns that mimic the structure of traditional fundraisers. Broadcasting is getting the word of your campaign out to as many potential donors as possible. A fundraising goal can be set for a specific period of time. Online tools from PayPal, Razoo and Causes have user-friendly interfaces to set up online payment accounts. Users can generate a donation link that can append to email, newsletter, and print materials. More sophisticated social media campaigns can use online scheduling tools like Hootsuite and Tweetdeck to pre-schedule Facebook and twitter posts in bulk. These content posts can include the donation link. Hootsuite also provides useful analytics of web traffic and engagement that allows users to schedule content at optimal times for maximum viewing. These analytics can also be included in campaign reports to granting agencies and stakeholders. (Table 2)

Beyond broadcasting content and donation links, the engagement method proactively manages donation opportunities. Engagement is about an organization's mission being so closely aligned with an issue that actors begin to think of them in tandem. This model requires that organizations have a clearly articulated mission statement, scanning relevant news events that align with the organization's mission and linking the two in their social media content. For example, one participating NPO focuses on domestic violence awareness. At the time of the workshop the state legislature was considering a bill that would provide greater protection of victims of family violence. The executive director and donor relationship manager identified this legislation as key to their organization's awareness campaign. The workshop activities helped them devise a social media campaign that used Facebook and Twitter to raise public awareness of the legislation. Because Facebook's content is more static and has a longer engagement life cycle,[13] they decided to post a sponsored petition to their Facebook page. They set the post to public but did not require names on the petition. This addressed participants' concerns about privacy and maximized the post's reach on social media. For Twitter, the participants opted to tweet link to newspaper stories covering the legislation, employing the engagement model of linking relevant content to organizational mission. They scheduled tweets at peak activity times and rotated tweets about the news story with tweets containing a link to a donation page that detailed how the organization counsels victims of family violence. In post-workshop communications, this organization reported that a state representative contacted them to thank them for increasing public support of the legislation. They also reported increased website traffic, online donations, and volunteer requests.

Social media is not a singular fundraising and communication tool but it can be a powerful addition to an NPO's outreach toolkit. NPOs have successfully used social media to build awareness and develop beneficial relationships. NPOs with injury prevention missions, particularly among vulnerable populations, should consider carefully how they use social media. The organizations in this case study benefitted from reflecting on issues of privacy, control and organizational protocols. In post-workshop surveys participants commented that they developed greater confidence in using social media, had developed a system that would improve their organizational structure, and could articulate to donors and constituents how social media reflects the organization's mission. Organizations that primarily serve young adults and low-income constituents cited high social media usage among their target populations as a reason to use these campaigns. Executives reported that social media analytics would enhance their organization's positional value to donors and political supporters. Injury prevention missions benefit from proactive diffusion of awareness and information. Social media is well suited for these aims. If used with deliberation, a social media presence can increase an injury prevention NPO's profile and bottom line.

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"The Internet is a Mask": High School Students' Suggestions for Preventing Cyberbullying

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Introduction: Interactions through technology have an important impact on today's youth. While some of these interactions are positive, there are concerns regarding students engaging in negative interactions like cyberbullying behaviors and the negative impact these behaviors have on others. The purpose of the current study was to explore participant suggestions for both students and adults for preventing cyberbullying incidents.

Methods: Forty high school students participated in individual, semi-structured interviews. Participant experiences and perceptions were coded using constant comparative methods to illustrate ways in which students and adults may prevent cyberbullying from occurring within their school and community.

Results: Students reported that peers would benefit from increasing online security, as well as becoming more aware of their cyber-surroundings. Regarding adult-provided prevention services, participants often discussed that there is little adults can do to reduce cyberbullying. Reasons included the difficulties in restricting online behaviors or providing effective consequences. However, some students did discuss the use of in-school curricula while suggesting that adults blame people rather than technology as potential ways to prevent cyberbullying.

Conclusion: Findings from the current study indicate some potential ways to improve adult efforts to prevent cyberbullying. These strategies include parent/teacher training in technology and cyberbullying, interventions focused more on student behavior than technology restriction, and helping students increase their online safety and awareness. [West J Emerg Med. 2014;15(5):587–592.]

INTRODUCTION

Technology exposure for youth has increased substantially in the past decade, with students spending about the same amount of time using technology as they do in school.[1] While access to technology has many advantages, it also increases the potential for cyberbullying.[2] Cyberbullying has been defined as the repeated use of technology to cause intentional distress or to threaten others.[3,4] Researchers have demonstrated that being a victim of cyberbullying was associated with negative mental health and behavioral concerns such as loneliness,[5] conduct problems,[4,6] and feelings of fearfulness.[7] Some studies have suggested that victims of cyberbullying were at increased risk for depression,[6–8] suicidal ideation,[9] and lowered self-esteem.[6,8] Given the impact cyberbullying may have on students' mental health, it is important to identify ways in which both students and adults can address this phenomenon.

The most commonly reported coping strategies in prior research on cyberbullying has been avoidance.[10,11] Avoidance strategies involved deleting hurtful messages or blocking the cyberbully from posting on online profiles,[3,10,11,13] either to ignore negative emotions or to discourage continued cyberbullying.[3,10] Participants also have reported coping strategies such as ignoring the situation,[10,12] substance use,[14] pretending that it did not bother them,[12] or talking to friends.[10,11,13] Students have been found to be less likely to talk to adults about cyberbullying when compared to victims of traditional bullying.[10,11,13] The reported reasons for not talking to adults about cyberbullying included the fear that reporting incidents would result in technology being taken away, as well as a lack of confidence in adults' ability to address the problem.[3,10,13]

The current literature provides some suggestions about how adults can address cyberbullying. These suggestions included clearer policies and psychoeducational interventions regarding online safety.[3] To date, few studies have focused on student suggestions for how adults can reduce or prevent cyberbullying. Student-generated strategies for parents have included setting age-appropriate limits on technology use, monitoring their children's technological activities, sharing evidence of cyberbullying with the school, and informing children about appropriate ways to resolve conflicts.[3] More research is needed to understand what students believe are effective strategies for adults because students may have a better understanding than adults about what would reduce or prevent peer engagement in cyberbullying.

The purpose of the current study was to explore student suggestions for preventing cyberbullying. The majority of studies regarding how students cope with cyberbullying refer to actions taken after an incidence occurred (e.g., deleting messages, telling an adult); however, information regarding how students may protect themselves from future cyberbullying would be beneficial. Additionally, allowing students to provide suggestions for adults based on their own experiences and perceptions would offer insight into how parents, teachers, and others in the community can help prevent cyberbullying. Further, it has been suggested that differences in cyberbullying perceptions may vary based on the school participants attend. Student reports indicated that urban students felt that cyberbullying, while still a concern, was not as important as other life effects when compared to suburban and rural students.[15] It is possible that other differences between urban and suburban students exist regarding how they respond to cyberbullying incidents.

There were 3 research questions: 1) How do students describe their approaches to preventing cyberbullying; 2) How do students believe adults can be effective in reducing cyberbullying?; and 3) Are there differences based on gender or school location (i.e., urban, suburban) in student perceptions of cyberbullying prevention?

METHOD

Participants

We used a combination of convenience (i.e., those readily available to the researchers) and criterion sampling (i.e., students had to meet a set of requirements to participate).[16] The criteria for participation included that the student was enrolled in the high school and had access to and used technology on a daily basis. The second criterion was assessed through a survey administered prior to the interview to assess the amount of access and use of technology (Table). Based on the recommended number of participants for this particular form of qualitative methodology,[16] the total target sample size was 40 participants, with 20 participants from each participating school to allow for cross-site analysis (i.e., across schools).[17] We recruited participants at the suburban school through the use of fliers placed in hallways and lobbies, as well as requests for volunteers that were made over a public announcement system each morning. When similar procedures at the urban school resulted in very few participants, additional steps were taken, as per the request of the dean of students and instructional technology teacher. These steps involved sending recruitment letters to 90 randomly chosen students across all 4 grades. These procedures resulted in the target of 20 participants per school, with all volunteers indicating sufficient technology usage and access. The suburban sample consisted of students ranging in age from 15 to 19 ($M = 17.5$, $SD = 1.05$) while the urban participants were from 15 to 18 years old ($M = 16.0$; $SD = 1.13$). Descriptive information for participants can be found in the Table.

Table. Participant demographic information.

			Total sample	
	Urban	Suburban	*n*	(%)
Gender				
Male	9	13	22	55%
Female	11	7	18	45%
Ethnicity				
African American	4	8	12	30%
Caucasian	13	6	19	47.5%
Hispanic	0	3	3	7.5%
Other	3	3	6	15%
Grade				
9th Grade	7	0	7	17.5%
10th Grade	6	2	8	20%
11th Grade	3	5	8	20%
12th Grade	4	13	17	42.5%
Technology usage				
Owned a cell phone	17	18	35	87.5%
Computer at home	20	20	40	100%
Internet at home	20	20	40	100%
Social networking profile	16	18	34	85%
Daily use*	2 hours	4 hours		

* Due to range (e.g., 'all day'), the mode of daily technology use is reported.

Data Collection

We obtained parental consent and student assent for all students under the age of 18. Students who were 18-years-old and over signed consent for participation. All procedures and forms were approved by the university Institutional Review Board. Graduate research assistants conducted semi-structured interviews with students to discuss various aspects of electronic communication and cyberbullying.[18] (For a copy of the interview protocol, contact the first author.) Interviews were recorded and then transcribed verbatim and uploaded into Atlas.Ti 5.0, a computer-based data management program.

Data Analysis

The current study used a sequential qualitative methodology with multiple phases of data analyses which involved cross-site analysis.[17] Data analysis was based on grounded theory and used an inductive-deductive approach.[19] Inductive (i.e., data-driven) methods helped to uncover themes based solely on information from respondents.[19] Deductive (i.e., literature-driven) methods were then used to determine how developed codes related to previous literature regarding cyberbullying.[19] Two researchers individually reviewed interviews to identify possible themes and met once a week to discuss themes and determine appropriate codes. After considering both data-driven and literature-based information, we developed an initial coding manual.[18]

The 2 researchers then applied the initial coding manual to each interview using a constant comparative method.[20] Two researchers individually applied codes to each interview based on question-response segments. They would meet weekly to discuss discrepancies in coding until consensus was obtained for each interview.[20] The coding manual was organized in a hierarchical structure that included primary codes (Level 1) and sub-codes for secondary themes (Level 2). The manual was revised after reviewing each interview resulting in a final manual based on consensus among raters.[21] Interrater reliability (i.e., IRR) for each interview was calculated until the researchers obtained 90% IRR on three consecutive interviews.[21] Once this criterion was met, raters divided and individually coded the remaining interviews and met weekly to determine IRR for 10% of each of the remaining interviews to control for coder drift.[19]

The suburban interviews were coded first, with an initial IRR mean of 86.5% and a total of 9 interviews being coded before the criterion of 90% on 3 consecutive interviews was met.[21] The coder drift IRR was 96.8%, with an overall mean IRR for all 20 interviews at 92.5%. The initial IRR for the urban sample was 88.9%, with a total of 11 interviews coded prior to meeting the criterion for individual coding. The IRR during the coder drift phase for the urban sample was 93.7%, with 91.3% as the overall IRR. Coding the urban interviews resulted in changes to the final coding manual; therefore, raters applied these changes to the suburban sample with an IRR of 100%. Frequency counts for the total sample, school location, and gender can be found in the figure.

RESULTS

Student Preventive Coping (Level 1)

Student Preventive Coping addressed research question 1 and involved strategies focused on averting cyberbullying (Figure). This could include general protective strategies or reactions to situations that had the potential to result in cyberbullying. This Level 1 code included 2 sub-codes (Level 2), *increased security and awareness* and *talk in person*. These strategies are discussed in the following sections, including differences based on gender and school location when appropriate.

Increased Security and Awareness (Level 2)

In an attempt to prevent cyberbullying, many students reported *increased security and awareness* ($n = 39$). These strategies included password protection, restricting who has access to online networking profiles, limiting the amount of personal information available online, and being more aware of the cyber-environment (e.g., who you are talking to). For example, one 18-year-old female suburban student explained that people "can only see what you put [online]," so students can reduce the risk of being cyberbullied by filtering what the information they make available. A 15-year-old female urban student also reported that people could put themselves at risk by not being aware of whom they were talking to, stating "people put on the internet mask and pretend to be who they want to be," so students should be mindful of their interactions online. Students described this increased awareness as a way of identifying potentially risky situations. Interestingly, students did not focus just on their own awareness but discussed making sure others are aware of potential cyberbullying situations as well. For example, a 17-year-old male urban student reported that he let his friends know of "this guy who was trying to start a fight, just saying threatening stuff and spreading rumors" by posting a warning to his Facebook page.

Talk In Person (Level 2)

The Level 2 code *talk in person* reflected the need to talk face-to-face with a person during a disagreement in order to prevent the negative situation from leading to cyberbullying. Sixteen students discussed the need for this preventive strategy due to the inability to detect tone or sarcasm online. A 17-year-old female urban student explained that cyberbullying might be prevented when having a disagreement online, if students would "get it off the Internet . . . [they] need to talk to them to their face, because the Internet can be like a mask so that [the other person] doesn't really have to face them." She further explained that sometimes this mask causes students to "say things they wouldn't say to your face or in a way that's hurtful." Approaching others in person can help a student discern tone, sarcasm, so that they can read and respond appropriately to the situation. An 18-year-old male suburban student stated that when "face-to-face you can see their expressions" and

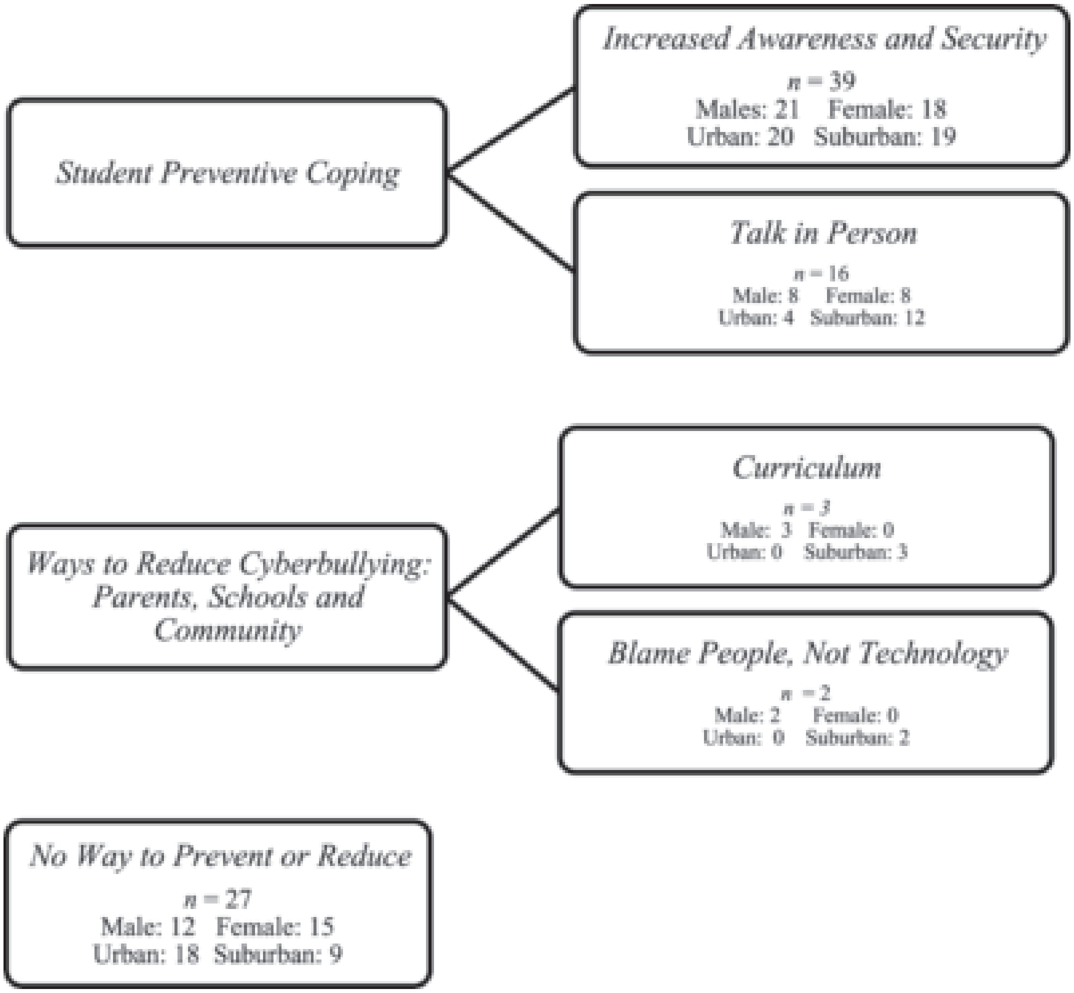

Figure. Coding hierarchy for the Level 1 codes student preventive coping, ways to reduce cyberbullying: schools and community, and no way to prevent or reduce.

understand if they were joking or not, whereas online “words can be misinterpreted” and escalate to cyberbullying.

Ways to Reduce Cyberbullying—Parents, Schools and Community (Level 1)

The second primary research question, student suggestions regarding ways in which adults (e.g., parents, school personnel, and community members) could address cyberbullying resulted in the Level 1 code *Ways to Reduce Cyberbullying—Parents, School and Community* and two Level 2 codes: *Curriculum* and *Blame people not technology* (Figure).

Curriculum (Level 2)

When describing how adults may help address cyberbullying, 3 male suburban students discussed the use of a curriculum or school information session, and this was coded *curriculum*. One 16-year-old stated that you “have to educate the actual people” and that this education could be provided as a class or assembly. The 3 students who discussed the use of a curriculum indicated that information should be provided early (i.e., elementary school) and by someone experienced with technology and cyberbullying. A 17-year-old male student explained schools could provide:

> Like a class, just say early . . . like late elementary, early middle school . . . People teaching should either be people who have done it before, know that it’s wrong, or people who have a good understanding about it.

Blame People, Not Technology (Level 2)

Two suburban male participants discussed *blame people, not technology* (see Table), explaining that adults should focus on the people abusing technology rather than the negative aspects of technology or taking it away from students. One participant explained: “no one wants to blame another human, cause humans can fight back.” He continued by stating that “teachers don’t want to get blamed, the students don’t want to get blamed, so they blame an object.” Students explained that addressing those who abuse the technology would change behavior (e.g., more effective consequences) instead of restricting technology access.

No Way to Reduce Cyberbullying (Level 1)

Twenty-seven of the 40 students reported the Level 1 code *no way to reduce cyberbullying,* with the majority of these students being from the urban school (Table). Students reported that nothing could be done to reduce cyberbullying, typically due to the difficulty tracking perpetrators, the ability to circumvent security blocks, and the fact that some students will continue despite consequences. When asked if there was a way to prevent cyberbullying, a 17-year-old male urban student answered, "Not that I can think of. . .you can't really stop somebody from talking to someone else because there is, like, freedom of speech." When asked the same question, a 16-year-old female suburban student replied, "I don't think so. Kids are going to be kids and they are going to argue regardless, they would just find another way."

DISCUSSION

Using in-depth individual interviews, we obtained information regarding how students believe cyberbullying may be prevented based on their personal experiences and perceptions of the phenomenon. When discussing how peers can help protect themselves from online peer aggression, the majority of the participants suggested increasing protection efforts when online, confirming previous literature.[3,10] In addition to online security, participants focused on how students need to be more aware of their cyber-surroundings. Students often described using social media, such as online message boards and social networking sites (e.g., posting on Facebook), to warn others of cyberbullies, to ask for guidance, and to let the online community know of cyberbullying threats. Students in the current study were likely to reach out to their online community and network when addressing cyberbullying, rather than going to an adult (e.g., teacher, parent). This particular finding indicates an important potential avenue for prevention and intervention.

While students discussed using their online resources to identify and prevent cyberbullying, they also reported that sometimes removing oneself from that medium can reduce cyberbullying which represented a unique finding. Students reported that when negative interactions begin online it is beneficial to approach the situation face-to-face so that the internet, serving as a mask, does not interfere with communication. Helping students recognize that the internet often makes it hard to discern meaning and/or tone is one way students and adults can help prevent cyberbullying.

Unique findings concerned information about how adults can reduce cyberbullying. This included the use of classroom or school-wide lessons to educate youth about cyberbullying that involve people who "have experience" in cyberbullying. This suggests that the credibility of those providing such curricula would be important to students and that trustworthiness would be assessed by how much knowledge the educator has, not only of technology but of cyberbullying behaviors. This indicates an important area for practice in that school personnel may need training before providing the services suggested by the participants in this study.

Few students reported adult intervention (e.g., teachers, parents) as an effective way to reduce cyberbullying. Further, students reported that rather than removing technology from victims for protection, schools and parents could develop strategies for addressing students who engage in cyberbullying behaviors. This finding suggests that schools and adults reconsider how they address cyberbullying, moving away from policies that restrict technology access and toward programs addressing specific attitudes or behaviors regarding cyberbullying. The finding regarding the limited number of suggestions for adult intervention was in contrast to a previous study where participants reported parents could help by monitoring and restricting their child's access to technology.[3] One reason may be developmental differences, as this earlier study included middle school students while the current study used high school students who may opt for more independent problem solving.

Finally, the current study used cross-site analysis[17] to examine differences in student suggestions based on gender and school location. In general there were no qualitative differences between male and female participants. Regarding school locations, urban students ($n = 18$) more often stated that there was nothing adults could do to reduce cyberbullying when compared to suburban students ($n = 9$). Similar to previous research,[15] urban students stated that while cyberbullying was a negative aspect of their lives, they had additional stressors that could take precedence over addressing electronic victimization, such as taking care of siblings or weekend jobs. Differences between urban and suburban students illustrate the need to take into account context and culture when providing services to students experiencing cyberbullying. Additional research is warranted to explore these differences and implications for research and practice.

LIMITATIONS

One limitation of the current study was using only individual interviews to obtain qualitative information. There are many methods for qualitative research (e.g., focus group interviews) that may have provided additional information. Further, during the 2 data collection points, though only separated by 3 months, advances in technology may have had an effect on student technology usage. For example, Facebook added instant messaging, which allowed students in the urban sample to discuss technology that was not available during data collection with suburban students. Also, changes were made during the second data collection phase at the urban high school because the researchers did not receive responses using the methods that had recruited suburban participants (e.g., fliers). Therefore, recruitment was adapted to the particular culture and context of the urban school.[22] However, the differences in recruitment procedures may have resulted in samples that differed in motivation to participate and this may have been confounded with urban/suburban differences.

CONCLUSION

Using their experiences with and perceptions of cyberbullying, participants in the current study were able to illustrate ways for adults and students to prevent cyberbullying and to explain why those strategies may be beneficial. Students appeared to rely more on themselves and their online community when addressing cyberbullying than has been suggested by prior research. They provided fewer strategies for adults and largely reported that adults have limited, and often ineffective, options for reducing cyberbullying. The participants in the current study emphasized the need to receive help from those trained in technology and cyberbullying. However, it is possible that rather than focus on adult-led prevention efforts, parents and teachers can help students increase their own skills and abilities when protecting themselves against online aggression. Future research is needed to further investigate these findings.

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Impact of Gender on Patient Preferences for Technology-Based Behavioral Interventions

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Introduction: Technology-based interventions offer an opportunity to address high-risk behaviors in the emergency department (ED). Prior studies suggest behavioral health strategies are more effective when gender differences are considered. However, the role of gender in ED patient preferences for technology-based interventions has not been examined. The objective was to assess whether patient preferences for technology-based interventions varies by gender.

Methods: This was a secondary analysis of data from a systematic survey of adult ($\geq$18 years of age), English-speaking patients in a large urban academic ED. Subjects were randomly selected during a purposive sample of shifts. The iPad survey included questions on access to technology, preferences for receiving health information, and demographics. We defined "technology-based" as web, text message, e-mail, social networking, or DVD; "non-technology-based" was defined as in-person, written materials, or landline. We calculated descriptive statistics and used univariate tests to compare men and women. Gender-stratified multivariable logistic regression models were used to examine associations between other demographic factors (age, race, ethnicity, income) and technology-based preferences for information on specific risky behaviors.

Results: Of 417 participants, 45.1% were male. There were no significant demographic differences between men and women. Women were more likely to use computers (90.8% versus 81.9%; $p=0.03$), Internet (66.8% versus 59.0%; $p=0.03$), and social networks (53.3% versus 42.6%; $p=0.01$). 89% of men and 90% of women preferred technology-based formats for at least type of health information; interest in technology-based for individual health topics did not vary by gender. Concern about confidentiality was the most common barrier to technology-based use for both genders. Multivariate analysis showed that for smoking, depression, drug/alcohol use, and injury prevention, gender modified the relationship between other demographic factors and preference for technology-based health information; e.g., older age decreases interest in technology-based information for smoking cessation in women but not in men (aOR 0.96, 95% CI 0.93-0.99 versus aOR 1.00, 95% CI 0.97-1.03).

Conclusion: Our findings suggest ED patients' gender may affect technology preferences. Receptivity to technology-based interventions may be a complex interaction between gender and other demographic factors. Considering gender may help target ED patient populations most likely to be receptive to technology-based interventions. [West J Emerg Med. 2014;15(5):593–599.]

INTRODUCTION

The utility of preventative care in reducing healthcare utilization and promoting healthy behaviors has been well established.[1–4] Research has repeatedly demonstrated that even a brief intervention by a healthcare provider can result in behavior change or serve as a bridge to further intervention, presenting a unique opportunity for emergency providers.[1,2,5–7] Emergency departments (ED) routinely encounter a wide range of high risk, potentially preventable behaviors, including substance abuse, violence, high-risk sexual practices, and untreated mental health conditions, often from patients who use the ED as their only connection to healthcare.[3] Time constraints, cost, and competing clinical priorities have historically deterred many providers from offering these needed services in the ED setting, increasing morbidity for patients and the cost to the health system as a whole.[3,8] The potential for technology-based interventions has piqued the interest of many ED physicians as a feasible, efficient, cost-effective solution to provide these needed services out of the ED.[6,9,10]

Gender has been shown to play a significant role in both the likelihood of high-risk behaviors and in responsiveness to interventions for these high-risk behaviors.[11–15] Multiple studies have suggested that multidimensional targeting to specific subpopulations, taking gender into consideration, increases responsiveness, prevents miscommunication, and enhances the likelihood of resulting in behavioral change.[16–21] Gender also seems to play a significant role in attitudes towards technology-based health information.[22–25] For example, men are more likely than women to be overall users of the Internet, but use online content more for leisure, including gaming, or for commercial or financial transactions; women have been shown to be more purpose-driven and more engaged with online health information.[22,26]

Previous studies have examined overall patient responsiveness to technology-based interventions for high-risk behaviors,[27,28] but few data exist on the effect of gender on ED patients' preferences toward these interventions or the interaction between gender and other demographic considerations when gauging interest in technology-based health information. The objective of this secondary analysis was to perform a gender-stratified examination of the preferences of adult ED patients towards a technology-based intervention.

METHODS

This was a secondary analysis of a previously published cross sectional survey study of English-speaking adult (18 years or age or older) patients on preferences for technology-based health information.[27] Participants were recruited from a high volume (approximately 105,000 annual visits) urban, tertiary care ED in New England. The ED serves a population that is approximately 60% white, 20% black, and 20% Hispanic, with 30% receiving government assistance. The institutional review board of the participating hospital approved all study procedures of the original survey study.

Research assistants (RAs) screened and enrolled a random sample of adult patients presenting to the ED for care, covering a convenience sample of shifts between the hours of 7AM to 12AM, 7 days a week, during a 9-month period. A computerized random number generator directed the RAs to rooms of patients to be screened for eligibility.

Patients were eligible for the study if they were clinically stable (Emergency Severity Index 2 to 5 as defined by the Agency for Healthcare Research and Quality[29] or as determined by the attending physician) and literate in English. Exclusion criteria included: being unable to provide verbal consent (presenting intoxicated), presenting with a psychiatric chief complaint, a victim of sexual assault, in police custody, or self-reporting previous completion of the survey. The data were made anonymous, and responses were not reported to clinical providers.

The survey collected information from eligible patients on demographics (including age, gender, education, and income), baseline technology use, preferences for receiving health-related information on 7 pre-defined risky behaviors through a series of technology-based modalities, and concerns for receiving health information through various technology mediums (full survey online at http://www.annemergmed.com, Appendix E2, E3).[27] We defined a "technology-based" intervention as web, text message, email, social networking, or DVD; "non-technology-based" was defined as being delivered in-person, written materials, or landline. The 7 pre-defined risky behaviors for the survey were: unintentional injury, peer violence, interpersonal violence, mental health, smoking, alcohol/substance abuse, and risky sex. We chose the topics based on the critical public health areas outlined by the 2009 Society for Academic Emergency Medicine Consensus Conference, "Public Health in the Emergency Department: Surveillance, Screening, & Intervention."[5] Questions regarding baseline technology-based use and behavioral intervention preferences were adapted, when possible, from validated questions administered to previous populations.[23,28,30,32] Demographic questions were from the Behavioral Risk Factor Surveillance System.[33] Participants completed the survey on an iPad, using DatStat (DatStat Illume, Seattle, WA), a HIPAA-compliant Web-based survey technology. If patients expressed discomfort using the iPad, they were permitted to complete the survey on paper; research assistants entered any paper survey data immediately into DatStat.

We calculated descriptive statistics (mean, standard deviations) and univariate comparisons (t-tests for continuous variables and Chi-squared tests for categorical variables) for demographic characteristics, current technology use, risky behaviors, intervention preferences, and concerns about technology-based behavioral health interventions. We also used

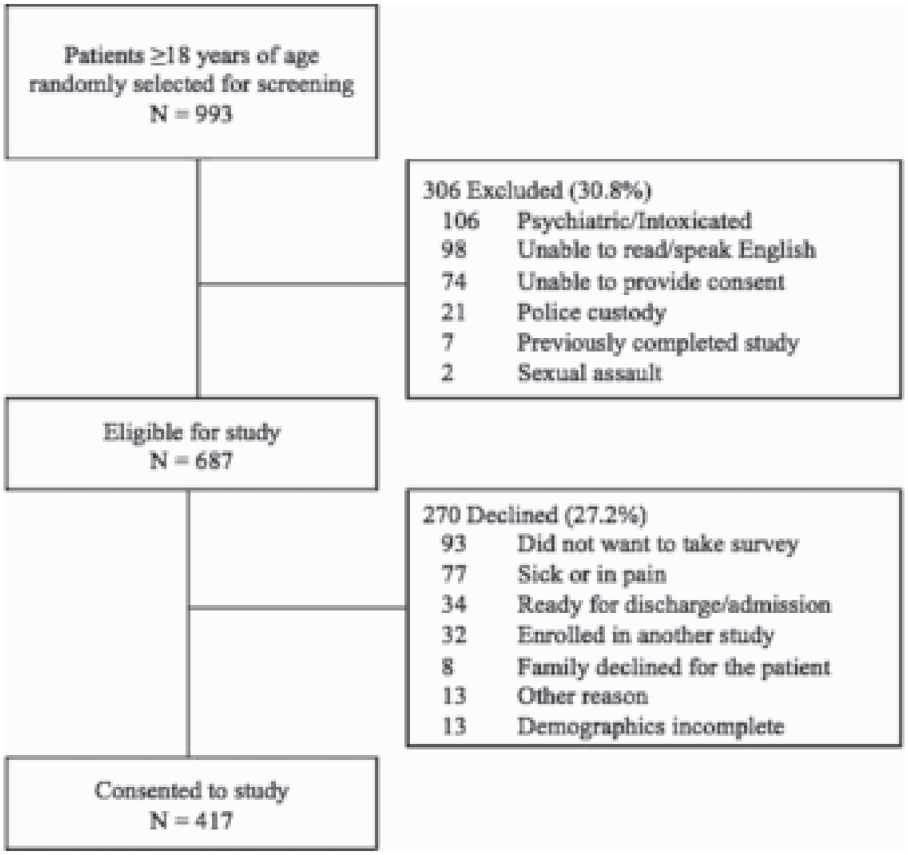

Figure. Adult patients randomly chosen for screening.

univariate comparisons, including 95% confidence intervals (CIs), to calculate gender differences in these variables.

We used gender-stratified multivariate logistic regression models to examine associations between other demographic factors (age, race, ethnicity, income) and intervention preferences (e.g., preferring technology- vs. non-technology based interventions). The goals of this analysis were to: 1) analyze whether demographic factors correlated differentially with a patient's intervention preference for the 2 genders; and 2) examine whether the influence of gender on a patient's preferences for and concerns about technology-based interventions varied based on the health topic. We defined the reference variables for the analyses were defined as: age (entered as continuous variable), race (white), ethnicity (Non-Hispanic), and income (low; below poverty line defined as income <\$25,000 or receiving public assistance). All statistical analyses were conducted using Stata 10 SE (Stata Corp LP, College Station, TX).

RESULTS

A total 993 adult patients were randomly chosen for screening. Of those screened, 69.2% were eligible, and of those eligible, 60.7% (417 patients) consented to participate and completed the survey (Figure); 45.1% of those consented were male. There were no significant demographic differences between male and female patients (Table 1). No information is available regarding unscreened patients; there were no significant gender differences between eligible patients who consented and refused for the study. Thirty-six patients (8.7%) completed paper questionnaires, and demographics of this group were similar to those completing surveys on iPads.

At baseline, women were more likely than men to use computers (90.8% versus 81.9%; p=0.03), Internet (66.8% versus 59.0%; p=0.03), and social networks (53.3% versus 42.6%; p=0.01). Most participants – 89.4 % of men and 90.8% of women – preferred a technology format for at least 1 type of health information. In the univariate analysis, there were no significant gender differences in preferred format for the various intervention topics.

Confidentiality was the most common concern about technology-based use for both genders across all mediums. A larger percentage of women expressed concern about confidentiality than men regarding social networking interventions (38.9% versus 26.6%, p=0.008). Males expressed significantly greater concerns about accessing health information by cell phone than women (4.8% versus 0.9%, p=0.01). There were no other significant differences between

Table 1. Baseline characteristics.

	Male (n=188)	Female (n=229)	p-value
Age (mean)	41 years	38 years	0.10
Race			0.99
White	111 (59)	135 (59)	
Black	23 (12)	26 (11)	
Ethnicity			0.60
Not Hispanic	144 (77)	169 (74)	
Hispanic	30 (16)	45 (20)	
Income			0.84
> Poverty	78 (42)	89 (39)	
≤ Poverty	85 (45)	110 (48)	
Baseline technology use			
Computer use (yes)	154 (82)	208 (91)	0.03
Internet use (yes)	111 (59)	153 (67)	0.03
Social network use	80 (43)	122 (53)	0.01
Cell phone use	180 (96)	213 (93)	0.17
Text message use	116 (62)	158 (69)	0.06
Interest in technology-based information, by topic			
Unintentional injury	55	53	0.66
Smoking cessation	43	49	0.41
Peer violence	57	59	0.74
Intimate partner violence	49	55	0.37
Depression	41	44	0.59
Drug or alcohol use	49	46	0.64
Safe sex	49	46	0.69

men and women regarding barriers to technology-based interventions.

Gender-stratified multivariable analysis showed that for smoking, depression, drug/alcohol use, and injury prevention, gender modified the relationship between other demographic factors and preference for technology-based health information based on the specific health topic (Table 2). For example, when asked about peer violence interventions, higher income increased women's odds of preferring a technology-based intervention, but income had no relationship with technology-based intervention for men. For information about depression, both younger men and women were more interested in information through a technology-based medium, but ethnicity only played a role for men and not for women.

For all significant independent variables, the overall odds ratio was the approximate mean of the stratified odds ratios, consistent with an interaction effect of gender with that variable. In the case of peer violence, the unstratified odds ratio for income obscured the effect of income on receptivity to technology-based information among women.

DISCUSSION

Several previous studies have examined the impact of gender on engagement with technology-based health information with most finding that females are more likely to be engaged than males.[17,24,26,34] Previous studies have found that the impact of gender on the desire to receive health information varies in relationship to other demographic variables.[35–39] This study supports this finding, specifically for preferences for technology-based interventions, and underscores the potential insight offered by a gender-stratified approach.

For instance, we found that younger age increases women's preferences for receiving information on smoking cessation through a technology-based medium, while age did not affect men's preferences for technology for that topic. In this case, an unstratified analysis for smoking cessation intervention preferences did not reflect the interaction between gender and age.[40] Similarly, the unstratified analysis did not indicate that income level was a factor in preference for technology-based information on peer violence; a stratified analysis, however,

Table 2. Multivariate analysis of preference for technology-based health information (adjusted odd ratios with 95% confidence interval).

	Overall sample	Male	Female
Unintentional injury			
Age	0.96 (0.95-0.98)	0.97 (0.95-0.99)	0.95 (0.93-0.98)
Race	1.16 (0.67-2.02)	1.34 (0.59-3.03)	1.04 (0.49-2.22)
Ethnicity	0.69 (0.35-1.36)	0.71 (0.26-1.94)	0.65 (0.26-1.65)
Income	1.97 (1.19-3.26)	2.20 (1.05-4.59)	1.83 (0.92-3.66)
Smoking cessation			
Age	0.98 (0.96-1.00)	1.00 (0.97-1.03)	0.96 (0.93-0.99)
Race	1.39 (0.73-2.66)	1.88 (0.72-4.92)	1.22 (0.49-3.06)
Ethnicity	0.81 (0.38-1.73)	0.47 (0.14-1.60)	1.08 (0.39-3.02)
Income	1.45 (0.80-2.62)	1.65 (0.69-3.94)	1.48 (0.64-3.41)
Peer violence			
Age	0.96 (0.95-0.98)	0.96 (0.94-0.99)	0.97 (0.94-0.99)
Race	0.71 (0.39-1.31)	0.82 (0.33-2.06)	0.61 (0.26-1.40)
Ethnicity	1.02 (0.49-2.12)	0.47 (0.15-1.41)	2.22 (0.78-6.32)
Income	1.46 (0.85-2.50)	0.97 (0.44-2.14)	2.36 (1.08-5.18)
Intimate partner violence			
Age	0.98 (0.97-1.00)	0.98 (0.96-1.01)	0.98 (0.96-1.01)
Race	1.01 (0.56-1.80)	0.84 (0.35-2.01)	1.14 (0.51-2.53)
Ethnicity	0.92 (0.46-1.83)	0.84 (0.29-2.46)	1.06 (0.42-2.69)
Income	1.07 (0.63-1.82)	0.63 (0.29-1.38)	1.80 (0.84-3.87)
Depression			
Age	0.96 (0.95-0.98)	0.97 (0.94-0.99)	0.96 (0.94-0.99)
Race	1.02 (0.59-1.79)	1.57 (0.67-3.71)	0.75 (0.35-1.60)
Ethnicity	0.74 (0.38-1.47)	0.28 (0.09-0.88)	1.40 (0.56-3.48)
Income	1.57 (0.95-2.58)	1.82 (0.86-3.84)	1.53 (0.77-3.05)
Drug or alcohol use			
Age	0.98 (0.96-1.00)	0.99 (0.96-1.02)	0.96 (0.94-0.99)
Race	1.37 (0.73-2.56)	2.43 (0.97-6.06)	0.76 (0.31-1.89)
Ethnicity	0.81 (0.38-1.70)	0.46 (0.15-1.42)	1.28 (0.45-3.64)
Income	1.36 (0.77-2.40)	1.62 (0.72-3.64)	1.22 (0.53-2.77)
Safe sex			
Age	0.99 (0.97-1.01)	0.99 (0.97-1.02)	0.99 (0.96-1.01)
Race	0.90 (0.50-1.63)	1.23 (0.51-2.94)	0.67 (0.29-1.53)
Ethnicity	1.08 (0.53-1.63)	0.80 (0.27-2.36)	1.38 (0.52-3.66)
Income	1.07 (0.63-1.83)	1.28 (0.58-2.83)	0.99 (0.47-2.11)

Reference:
Age (Young*)
Race (White)
Ethnicity (Non-Hispanic)
Income (Poverty, <$25,000/year or reported public assistance)
*Age was entered into the model as a continuous variable. The odds ratios for age are for each additional year of age.

reveals a relationship between higher income and technology preference in women only. The findings of this study may help providers more specifically identify and categorize subpopulations that prefer technology-based interventions, and others that might find non technology-based programs more acceptable.

Unlike previous studies, this study also highlights gender differences in preferences for technology-based mediums in the

ED population. In an environment where time and resource constraints often prevent individual targeting of interventions, our findings suggest that using a gender-specific approach may help enhance utility of available resources by identifying subpopulations that may be most receptive.

Considering gender, and identifying target subpopulations more open to technology-based interventions, may be particularly useful for groups with historic disparities in access to care. For example, several previous studies have demonstrated that men are less likely than women to seek treatment for depression.[19,41] Our study's data suggest that young, non-Hispanic males may be more receptive towards receiving information about depression through a technology-based medium, thereby identifying a potential avenue to intervene for a subpopulation that may have been previously undertreated. It is important to note that, as an exploratory study, this analysis did not match interest in a behavioral intervention with assessments of that specific behavior; assessing interest in a broad range of technologies within groups demonstrating high-risk behaviors is still incompletely studied.

LIMITATIONS

The strength of this study is the use of a systematic survey that included validated questions whenever possible. Stratifying by gender allowed us to examine the relationship between gender and other demographic variables and interest in technology-based health information in a way not possible by including gender as a single independent variable. However, there were also study limitations. The study was conducted in 1 urban academic ED in the Northeast with only English-speaking adults. The attitudes in this population may not be generalizable to other populations with different demographics, education levels, and societal norms. The survey was primarily conducted on an iPad interface, which may have introduced a social desirability bias towards technology-based mediums. However, participants were given the option to complete the survey on paper to minimize any effect, and the demographics from those that elected to complete the survey on iPad are consistent with those that elected to complete the survey on paper. Any potential social desirability impact on preferences are likely to be consistent among both men and women and unlikely to affect any findings regarding gender differences in preferences, which was the focus of this secondary analysis. This analysis was also limited to exploring gender differences in relationship to age, race, ethnicity, and income level. Future studies may want to include additional variables, such as educational level, as an expanded analysis may reveal additional important insights into patient preferences for technology-based information. As a secondary data analysis, we may be underpowered to detect differences between genders that are present (i.e. Type II error); the relatively large confidence intervals in Table 2 reflect the small sample size of this study. Several of the identified differences produced a confidence interval approximating the value of one. The significance of these differences may change in a larger study that includes more participants. Finally, it is important to note that this analysis explored gender differences in interest in interventions through a technology-based medium. It does not explore gender differences in overall interest for health information regarding these health topics. It also did not explore gender differences in acceptability or feasibility of technology-based interventions.

CONCLUSION

Gender plays a major role in initiating and continuing high-risk health behaviors; our study suggests it may also play a role in preferences for technology-based versus traditional interventions to address these types of behaviors in the ED. A gender-specific approach to designing behavioral interventions may result in screening and intervention strategies that are more acceptable and effective. Future studies will be needed to determine how using a gender-specific framework can optimize the effectiveness of brief, technology-based interventions in the ED population.

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Demographic and Psychosocial Characteristics of Mobile Phone Ownership and Usage among Youth Living in the Slums of Kampala, Uganda

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Introduction: The use of mobile phones and other technology for improving health through research and practice is growing quickly, in particular in areas with difficult-to-reach population or where the research infrastructure is less developed. In Sub-Saharan Africa, there appears to be a dramatic increase in mobile phone ownership and new initiatives that capitalize on this technology to support health promotion campaigns to change behavior and to increase health literacy. However, the extent to which difficult-to-reach youth in the slums of Kampala may own and use mobile phones has not been reported despite the burden of injuries, substance use, and HIV that they face. The purpose of this study is to determine the prevalence of mobile phone ownership and use in this high-risk population and to identify psychosocial characteristics that may differentiate those owning and using a phone from those who do not.

Methods: We conducted secondary analyses of the Kampala Youth Survey ($N=457$). Data collection took place in 2011, and the survey was designed to quantify high-risk behaviors in a convenience sample of urban youth living on the streets or in the slums, 14–24 years of age, who were participating in a Uganda Youth Development Link drop-in center for disadvantaged street youth. We computed chi-square analyses to determine any significant differences in psychosocial characteristics based on phone ownership and use.

Results: Overall, 46.9% of youth reported owning a mobile phone and ownership did not vary by sex but was more common among youth older than 18 years of age. Mobile phone ownership was also more common among those who reported taking care of themselves at night, who reported current drug use and who reported trading sex for money, food or other things.

Conclusion: Given that nearly half of the youth own and use phones daily, new research is needed to determine next steps for mobile health (mhealth), including the feasibility of using mobile phones for data collection and interventions with this hard-to-reach population. Moreover, this technology may also be suitable for injury-specific research given that there were few differences with respect to injury-related variables in mobile phone ownership and usage. [West J Emerg Med. 2014;15(5):600–603.]

INTRODUCTION

Mobile health, or mhealth, is a new emerging field of the "use of mobile information and communication technologies for improving health."[1] More specifically, mhealth includes using mobile technologies, which are any device or application that has cellular or wireless capabilities.[2] Mhealth is used in many areas directly or indirectly related to health (e.g., education and awareness, service care centers, patient monitoring, disease outbreaks and surveillance, emergency medical response, health information system, distance learning education, and health financing).[3] It is also used in the creation and adaptation of health interventions to individuals.[4] The use of mhealth is rapidly emerging in developing countries.[5] A United Nations Foundation and Vodafone Foundation collaborative report found that mobile phones usage in developing countries is the mostly widely used technology in health infrastructures.[5]

Mhealth programs appear to be frequently used in Africa, especially in Uganda, South Africa, and Rwanda.[5] Mobile phone usage in Africa has soared.Mobile phones, which are more frequently used in Africa than landlines, have become integral in the economy of African countries.[6] Although those who initially owned and used mobile phones were educated, young, wealthy, male and living in urban areas, more recently, cell phone use has expanded to include those living in rural areas, the elderly, and those with less resources.[6] According to an Afro Barometer report, 72% of the respondents in 34 countries in Africa stated that they owned and used a mobile phone.[7] In Uganda alone in 2009, there were about 9.5 million mobile phone subscribers.[8]

The use of mobile phones for public health campaigns ranges from management of chronic to communicable diseases.[5] The use of SMS (short message service or text messaging) has become a popular, cost-effective way of promoting awareness, education, and intervention of diseases.[5] The use of text messaging, specifically, has helped with medication and appointment adherence and public awareness.[5] In a study on the use of mobile phone technology for the enhancement of the prevention of mother-to-child transmission of HIV program, women use cell phones to call their healthcare provider, for medication reminders and to schedule appointments.[9] From a healthcare provider perspective, mobile phones are very helpful, less time consuming, and more cost efficient than traditional methods of seeing or interacting with patients.[10]

Even though there has been substantial growth in mobile phone use for health promotion and prevention campaigns, there seem to be very few mhealth strategies for violence and injury prevention research or programming specifically. One recent study used a low-cost mobile phone system for prospective surveillance of access to dog-bite care and risk of dog-bite exposure in Pakistan.[11] Also, while research demonstrates that many population groups in Uganda have access to mobile phones, the extent to which these findings extend to poor youth who live in the slums of Kampala is not known. For example, one recent study demonstrated that about 27% of secondary school students in Mbarara, Uganda, have a mobile phone.[12] The youth who live in the Kampala slums is a high priority for prevention strategies for a range of risk-behaviors including injuries and violence, but it can be difficult to reach these youth using traditional methods since most do not attend school.[13,14]

The goal of this study is to document the prevalence of mobile phone ownership and usage and also to examine factors that differentiate phone ownership. We hope that this information can assist in program planning and development and future research that seeks to improve the health and well-being of these marginalized youth using innovative mhealth approaches.

METHODS

Survey Participants and Recruitment

The overarching goal of the secondary analyses of this cross-sectional survey called the "Kampala Youth Survey," conducted in May and June 2011, was to quantify and describe high-risk behaviors and exposures in a convenience sample of urban youth (14 to 24 years of age) living on the streets or in the slums who were participating in a Uganda Youth Development Link (UYDEL) drop-in center for disadvantaged street youth. UYDEL is a not-for-profit organization that operates 8 centers with a primary goal of reducing risk behaviors such as HIV acquisition and drug use among youth, primarily ages 12–24, living in the slums. The details of the survey have been described elsewhere.[13–15] Brief, face-to-face surveys, lasting approximately 30 minutes, were administered by trained UYDEL staff across 8 drop-in centers across Kampala. Participating youth received snacks and transportation for completing the survey. No identifying information was collected and the surveys were completely anonymous. Surveys were administered in English or Uganda's local language Luganda, and to the extent possible, in private locations, to ensure privacy of survey questions and responses. Recruitment took place using word-of-mouth, and youth between 14 and 24 years of age were invited to participate following the approved assent and consent process. The participation rate was 90.9%. Analyses are based on the 457 completed surveys (31.1% boys and 68.5% girls).

Survey Measures

The questionnaire, modeled from existing surveys, has been described elsewhere.[13–17] Measures included demographic characteristics, family context, alcohol and drug use, injuries, violence, suicidal behaviors and sexual behavior, including victimization, and are available from the authors upon request. Information about mobile phone ownership and usage was based on two questions: 1. Do you have your own mobile phone; and 2. How often do you use a mobile phone (your own or someone else's)? Youth were also asked if they "get on the

Table. Associations between psychosocial correlates and mobile phone ownership and daily usage among youth living in the slums of Kampala (N=415).

	Own and use a mobile phone daily % (n)	Do not own a mobile phone, and use mobile phones weekly or less often. % (n)	Wald Chi Square
Percent reporting	45.5	54.5	P-value
Sex			
Girls/women	46.8 (133)	53.2 (151)	0.512
Boys/men	43.4 (56)	56.6 (73)	
Age			
< 18 years	22.3 (39)	77.7 (136)	<0.0001*
≥18 years	62.9 (149)	37.1 (88)	
Both parents dead	48.5 (48)	51.5 (51)	
One parent dead	43.4 (66)	56.6 (86)	0.719
Both parents living	44.4 (68)	55.6 (85)	
Self-monitoring/care at night	53.5 (92)	46.5 (80)	0.0062*
Parental physical abuse of child	46.5 (121)	53.5 (139)	0.5
Any drunkenness (past month)	52.9 (46)	47.1 (41)	0.0594
Any drug use (past month)	61.0 (47)	39.0 (30)	0.0023*
Involved in physical fight (past year)	50.0 (64)	50.0 (64)	0.186
Threatened or injured with a weapon	49.6 (63)	50.4 (64)	0.345
Raped (ever)	53.5 (53)	46.5 (46)	0.058
Traded sex for money, food, or things (ever)	57.9 (77)	42.1 (56)	0.0006*
Sadness (past year)	45.1 (139)	54.9 (169)	0.8392
Suicide attempt (past year)	50.0 (20)	50.0 (20)	0.5515

* Statistically significant p-values (<0.05). Percentages may not add up due to rounding.

internet," if they have an email account and if they use Facebook.

Ethical Approvals

The study was approved by the Institutional Review Board at Georgia State University and by the Uganda National Council for Science and Technology. Funding to conduct the study was obtained from the International Strategic Initiative at Georgia State University and also from funds leveraged through collaboration with the Emory Center for Injury Control.

Data Analysis

We computed descriptive analyses and Wald F Chi Square analyses. The analytic sample (n=415) was constructed to include two groups: 1. Those who reported that they had a phone and used it daily (45.5%); 2. Those who did not have a phone and did not use a phone daily (54.5%). Participants who reported using a phone daily but who did not have their own phone or who had their own phone but did not use it daily were excluded from analyses (n=42).

RESULTS

The demographic characteristics and psychosocial characteristics of owning a mobile phone and using it daily are presented in the table. Owning a mobile phone did not vary by sex, but was more common among youth older than 18 years of age. Among those less than 18 years of age, 22.3% reported mobile phone ownership and use compared to 62.9% among those age 18 years or older ($p<0.0001$). Mobile phone ownership was also more common among those who reported taking care of themselves at night, who reported current drug use and who reported trading sex for money, food or other things.

In terms of using other technology, 9.3% of youth reported using the internet, 5.3% reported using an email account, and 4.9% reported using Facebook.

DISCUSSION

This study of mobile phone ownership and use among youth living in the slums of Kampala demonstrates surprisingly high levels of both mobile phone ownership and use given their high levels of poverty. The findings also demonstrate that while internet and social media use remains low in this population (less than 10%), use of mobile phones is much more common. Additionally, while phone ownership and use was more common among youth older than 18 and those who were monitoring themselves, there were few psychosocial factors that distinguished phone users from those who did not. The findings demonstrate that youth involved in high-risk behaviors including drug use and commercial sex had higher prevalence of owning and using mobile phones.

Some limitations restrict the interpretation of the findings of this study, including potential limited generalizability of the youth, limited questions about mobile phone use, underreporting of risk behaviors, and a relatively small sample size. However, it is unclear if any of these potential limitations would impact mobile phone ownership or use.

Because of the scarcity of data related to high-risk behaviors among vulnerable youth in Uganda, the current study provides support for future research that examines the feasibility of using mobile phones in service delivery and interventions with hard-to-reach populations. Also, because internet and social media use remains low in this population, mobile phones should be examined as potential viable strategies for data collection and interventions in the short term. Moreover, given that mobile phone ownership and use did not vary for most other factors examined, using mobile phones may be suitable for data collection on a range of issues including violence and injuries. While there are a number of studies examining use of mobile phones for both data collection and dissemination of health promotion messages, few studies if any, seem to be using this technology for injury specific research[11] which may be another innovative approach for increasing the scope and reach for injury prevention research more broadly, particularly in underserved settings and populations.[11]

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Texting While Driving: Does the New Law Work Among Healthcare Providers?

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Introduction: This study assessed whether Georgia Senate Bill 360, a statewide law passed in August 2010, that prohibits text messaging while driving, resulted in a decrease in this behavior among emergency medicine (EM) and general surgery (GS) healthcare providers.

Methods: Using SurveyMonkey®, we created a web-based survey containing up to 28 multiple choice and free-text questions about driving behaviors. EM and GS healthcare providers at a southeastern medical school and its affiliate county hospital received an email inviting them to complete this survey in February 2011. We conducted all analyses in SPSS (version 19.0, Chicago, IL, 2010), using chi-squared tests and logistic regression models. The primary outcome of interest was a change in participant texting or emailing while driving after passage of the texting ban in Georgia.

Results: Two hundred and twenty-six providers completed the entire survey (response rate 46.8%). Participants ranged in age from 23 to 71 years, with an average age of 38 (SD=10.2; median=35). Only three-quarters of providers (n=173, 76.6%) were aware of a texting ban in the state. Out of these, 60 providers (36.6%) reported never or rarely sending texts while driving (0 to 2 times per year), and 30 engaged in this behavior almost daily (18.9%). Almost two-thirds of this group reported no change in texting while driving following passage of the texting ban (n=110, 68%), while 53 respondents texted less (31.8%). Respondents younger than 40 were more than twice as likely to report no change in texting post-ban compared to older participants (OR=2.31, p=0.014). Providers who had been pulled over for speeding in the previous 5 years were about 2.5 times as likely to not change their texting-while-driving behavior following legislation passage compared to those without a history of police stops for speeding (OR=2.55, p=0.011). Each additional ticket received in the past 5 years for a moving violation lessened the odds of reporting a decrease in texting by 45%. (OR=0.553, p=0.007).

Conclusion: EM and GS providers, particularly those who are younger, have received more tickets for moving violations, and with a history of police stops for speeding, exhibit limited compliance with distracted driving laws, despite first-hand exposure to the motor vehicle crashes caused by distracted driving. [West J Emerg Med. 2014;15(5):604–608.]

INTRODUCTION

An estimated 25% of motor vehicle crashes in the United States are caused by distracted driving,[1] and fatalities from distracted driving increased by 28% from 2005 to 2008.[2] Novice and experienced drivers alike demonstrate decreases in driving performance while using phones,[3] often demonstrating similar levels of violations as those who are driving while intoxicated.[4] While 12% of people self-report texting while driving,[5] the increase in texting volumes between 2001 and 2007 has resulted in over 16,000 *additional* motor vehicle fatalities.[2] Drivers who text make an increased number of errors, such as responding more slowly to the onset of brake lights and impairment in forward and lateral driving control, sustaining more crashes than drivers who do not text.[6–9] Texting has been shown to be more dangerous than other forms of distracted driving, such as talking on the phone.[10]

To date, 39 states and the District of Columbia have enacted distracted driving laws, with several more considering adoption.[11–12] Georgia Governor Sonny Perdue approved the passage of a state law that effectively banned texting while driving, beginning in July 2010 However, this law's actual role in deterring texting behind the wheel is questionable at best, with no studies so far demonstrating a valid effect since the law's inception and very few citations issued since.

As first-hand witnesses to injuries and fatalities as a result of motor vehicle crashes, emergency medicine and general surgery physicians, mid-level providers and nurses are well aware of the bodily risks associated with distracted driving. Emergency medicine (EM) providers are critical to educating patients about the dangers of texting while driving, as they are often the first to treat victims of motor vehicle collisions that could be caused by distracted driving. Personal texting behavior likely has a significant correlation with patient counseling on similar behaviors, as previous studies have shown that physicians with poor personal health behaviors, such as tobacco or alcohol use, lack of exercise, and lower rates of seatbelt use, are less likely to counsel their patients about these health practices.[13] With the initiation of Georgia's ban on texting while driving, it is unclear whether this law will actually have its intended effect of decreasing the prevalence of texting behind the wheel, particularly among healthcare providers who are vital in providing counseling to at-risk patients.

The aim of this study was to evaluate if the passage of Georgia Senate Bill 360, which prohibits text messaging while driving, effectively decreased the incidence of texting while driving among emergency medicine and general surgery providers. Secondary aims were to determine if texting behavior varies with gender, age, time spent driving daily, position, occurrence of previous moving violations, texting and emailing frequency, and attitudes towards this behavior. We assessed survey responses for a change in self-reported texting while driving after the passage of the law.

METHODS

This study employed a cross-sectional online survey to evaluate the attitudes and behaviors of EM and general surgery providers. The providers were all employees of a nationally renowned medical school or its affiliate county teaching hospital, located in a large, southeastern city in the U.S. The study protocol was reviewed by the departmental review committee and the institutional review board and granted an IRB exemption.

We used the online survey tool SurveyMonkey® to create a web-based survey containing up to 28 multiple choice and free-text questions, depending on participant responses. Emails inviting participants to complete a brief online survey about driving behaviors were sent to all EM and general surgery residents, fellows, faculty, mid-level providers, and nurses in January 2012. An email reminder was sent to the same providers after one week. We included all surveys completed within 1month; any survey responses that were incomplete were omitted from study results. Only those providers who regularly drove a car or used a cell phone were included in this study, and the one respondent who did not usually drive was excluded.

The primary outcome of interest assessed respondents for a change in texting and emailing while driving before and after passage of the texting ban in Georgia. Logic design allowed for an assessment of texting behaviors prior to the ban only if participants demonstrated knowledge of the existing ban in Georgia. In addition to these variables, demographic characteristics such as gender, age, specialty, position, and clinical site, were queried, as various providers and clinical sites provide different exposure to trauma. Participants were also asked what type of car they usually drove, how long they drove on a typical workday, how often they sped, and if they had received tickets for moving violations, including speeding tickets. These variables were assessed as vehicle choice and driving habits can reflect perceptions of safety and subsequent behavior while driving. We assessed survey respondents on cellular phone use, including how many minutes they spent talking on the phone daily, how many texts and emails they received and sent per day, how many minutes they talked on the phone while driving, and if they used hands-free technology to communicate while driving. Attitudes towards texting and driving were assessed with several questions regarding the perceived danger level of this behavior, the need for a texting ban in Georgia, and the relative effectiveness of different hypothetical scenarios that aimed to curb texting while driving.

All responses were automatically entered into a database in SurveyMonkey®, and were exported to SPSS (version 19.0, Chicago, IL, 2010) for analysis by the PI. We checked the data for missing and improbable values; responses that were improbable were treated as missing values, and incomplete survey responses were deleted from the dataset.

We used frequency percentages w to evaluate demographic characteristics. The variable "age" was dichotomized to greater and less than 40 years for purposes of performing chi-square analyses. For each provider that reported awareness of a texting ban, we calculated a delta score to determine if texting while driving significantly changed with passage of this law, which we analyzed with frequency percentages. As this outcome variable could then be dichotomized into "decrease in texting" versus "no decrease in texting," we used chi-square tests and binary logistic regression analyses to determine if behavior

Table 1. Demographics of healthcare providers participating in texting-while-driving survey.

	Frequency (n)	Valid percent (%)
Gender		
Female	130	57.3
Male	97	42.7
Specialty		
Emergency medicine	161	70.9
General surgery	66	29.1
Position		
Registered nurse	50	22.0
Physician assistant or nurse practitioner	17	7.5
Resident 1	23	10.1
Resident 2	16	7.0
Resident 3	18	7.9
Resident 4	5	2.2
Resident 5 or higher	3	1.3
Fellow or clinical instructor	14	6.2
Assistant professor or higher	81	35.7
Primary clinical site		
Children's hospital	8	3.5
Suburban affiliate hospital	1	0.4
Main university hospital	77	33.9
Affiliate university hospital	33	14.5
County hospital	148	65.2
Type of car		
4-door sedan	121	53.3
2-door coupe	21	9.3
Station wagon	6	2.6
Convertible	6	2.6
Sports car	10	4.4
Minivan	9	4.0
Sport utility vehicle	58	25.6
Pick-up truck	4	1.8
Don't usually drive	1	0.4
Motorcycle	1	0.4
Average time spent driving daily**		
31 min–1 hour	100	44.1
Frequency of speeding**		
Almost daily	108	47.6
Number of tickets for moving violation**		
0	122	53.7

Table 1. Continued.

	Frequency (n)	Valid percent (%)
	Mean	Standard deviation
Number of minutes spent on phone daily	51.5	44.3
Number of texts sent/received daily	20.6	28.6

* Some participants had primary affiliations with more than one site, so values do not sum to 100%.

† Reported as median of aggregate data.

change was differentially associated with gender, position, and age, as well as other driving behaviors and attitudes.

RESULTS

Two hundred and twenty-six surveys were completed, with some questions skipped among different respondents based on logic design. Participants ranged in age from 23 to 71 years, with a mean age of 38.2 years (SD 10.2, median age 35 years). More than half of respondents were female (n=130, 57.3%). Most survey participants were EM practitioners (n=161, 70.9%). Twenty-two percent of respondents were nurses (n=50), 34.8% were residents or fellows (n=79), and 35.7% were at the assistant professor level or higher (n=81). Most providers primarily worked at the affiliate county hospital (n=148, 65.2%). Over half of the sample reported usually driving a 4-door sedan (n=121, 53.3%), and a quarter of the respondents drove SUVs (n=58, 25.6%). See Table 1 for details of the demographic data collected.

Only three-quarters of providers (n=173, 76.6%) were aware of a texting ban in the state. Out of these, only 60 (36.6%) reported never or rarely sending texts while driving (0 to 2 times per year), and 30 engaged in this behavior almost daily (18.9%). Almost two-thirds of this group reported no change in texting while driving following passage of the texting ban (n=110, 68%), while 53 people texted less (31.8%). See Table 2 for further details on changes in texting while driving behavior after passage of the ban.

Respondents 40 or older were more likely to report a decrease in texting post-ban than younger participants (OR=2.31, p=0.014). Providers who had been pulled over for speeding in the previous 5 years were less likely to decrease their texting while driving following legislation passage (OR=2.55, p=0.011). Logistic regression showed a significant relationship between the number of tickets received in the past 5 years for moving violations and change in texting behavior, with each additional ticket lessening the odds of reporting a decrease in texting by 45%. (OR=0.553, p=0.007). No significant differences in texting behavior changes were found between behavior change and our other variables, including gender, specialty, position, clinical site, or indicators of daily

Table 2. Change in texting while driving after Georgia state law banned the practice.

	Frequency (n)	Valid percent (%)
Change in texting after ban		
Texted more (Delta<0)	1	0.6
No change (Delta=0)	110	67.5
Texted minimally less (Delta=1–2)	40	24.5
Texted much less (Delta=3–4)	12	7.3

phone use. Table 3 details these variables that were found to have significant associations with a change in texting while driving.

DISCUSSION

This study demonstrates that only three-fourths of healthcare providers were aware of a texting ban in Georgia that, at the time of the survey, had been in place for approximately 18 months. Efforts should be made to increase community awareness of this legislation, which could potentially increase compliance and decrease injury rates due to distracted driving. Even among the providers who were aware of the ban, almost two-thirds did not report a change in their texting while driving following legislation passage. EM physicians and trauma surgeons can provide valuable counseling to the patients they treat for injuries related to distracted driving. However, those who text and drive will be less likely to effectively counsel their patients against driver texting, which has been shown to cause significant morbidity and mortality in motor vehicle collisions.

The rate of providers who reported texting while driving more than twice a year (63%) was higher than the self-reported rate of 12% found in the literature.[2] This was likely due to the increased prevalence of texting over time since publication of this statistic, as use of personal phones with texting capabilities has become more widespread. Compared with the general population, medical providers also are likely in better economic positions to have access to personal phones with texting functions, which would also account for an increased rate of texting while driving compared with the general population.

Older drivers were more likely to report a decrease in texting while driving, which is consistent with numerous studies demonstrating that these drivers tend to have less traffic violations than younger drivers. Individuals who reported receiving tickets for speeding and other moving violations were much less likely to report a decrease in texting following the ban compared to those with better driving records. These findings pose a potential difficulty for effective enforcement of this legislation, as those receiving more violations might not significantly or consistently alter their behaviors.

While driver texting increases injuries and fatalities, the efficacy of laws banning texting while driving, such as the one enacted in Georgia in 2010, have yet to be proven, as even many providers who were aware of a ban did not change their behavior. Communities should invest in education programs to increase awareness of the dangers due to texting while driving, from commercials and roadside signs to increasing prominence in drivers' education classes. Attention should specifically be paid to initiatives that target healthcare providers, who can have a significant role in counseling their patients against this dangerous behavior.

LIMITATIONS

As this study sought to evaluate texting while driving among healthcare providers, generalizability of study results is limited to this particular population and geographic area. All survey data was collected anonymously, though the potential for misrepresentative data due to social desirability bias still exists. Some participants did not complete the survey in its entirety, which limited some comparisons of different variables. As we did not want to indicate whether Georgia had passed a texting ban, we did not evaluate if participants had received any tickets for texting while driving; however, we evaluated ticketing of different offenses such as speeding and moving violations in general. Also, recall bias could have influenced the results, as participants were required to self-report

Table 3. Significant associations with change in texting while driving.

	Increase/no change in texting (%)	Decreased texting (%)	p-value	Odds ratio (confidence interval)
Age			0.014	2.31 (1.18–4.55)
<40	75 (75%)	25 (25%)		
40+	35 (56.5%)	27 (43.5%)		
Pulled over for speeding in the past 5 years			0.011	2.55 (1.23–5.29)
Yes	51 (79.7%)	13 (20.3%)		
No	60 (60.6%	39 (39.4%)		
Number of tickets for moving violations in the past 5 years			0.007	0.55 (0.36–0.85)

behaviors that occurred in the past, and inaccurate representations of their behaviors could have affected results. Finally, the scope of texting while driving was limited in this study to sending and receiving text messages and emails. However, Georgia Senate Bill 360 prohibited all use of cellular phones when not used for spoken communication. This could include activities such as typing in directions in map applications or checking social media websites. Thus, this study did not examine the full spectrum of activities that would qualify as cell phone-related distracted driving.

CONCLUSION

In conclusion, the 2010 Georgia ban on texting while driving did not demonstrably change this behavior among EM physicians or trauma surgeons. Younger providers as well as those who reported police stops for speeding and more moving violations in the past 5 years were least likely to change their behaviors. Future studies should evaluate the efficacy of different interventions in enhancing compliance with this law. Additionally, the same survey could be repeated among the same population to assess if increased awareness of the law has changed their texting while driving frequencies.

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Screening for Violence Risk Factors Identifies Young Adults at Risk for Return Emergency Department Visit for Injury

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Introduction: Homicide is the second leading cause of death among youth aged 15–24. Prior cross-sectional studies, in non-healthcare settings, have reported exposure to community violence, peer behavior, and delinquency as risk factors for violent injury. However, longitudinal cohort studies have not been performed to evaluate the temporal or predictive relationship between these risk factors and emergency department (ED) visits for injuries among at-risk youth. The objective was to assess whether self-reported exposure to violence risk factors in young adults can be used to predict future ED visits for injuries over a 1-year period.

Methods: This prospective cohort study was performed in the ED of a Southeastern US Level I trauma center. Eligible participants were patients aged 18–24, presenting for any chief complaint. We excluded patients if they were critically ill, incarcerated, or could not read English. Initial recruitment occurred over a 6-month period, by a research assistant in the ED for 3–5 days per week, with shifts scheduled such that they included weekends and weekdays, over the hours from 8AM-8PM. At the time of initial contact in the ED, patients were asked to complete a written questionnaire, consisting of previously validated instruments measuring the following risk factors: a) aggression, b) perceived likelihood of violence, c) recent violent behavior, d) peer behavior, e) community exposure to violence, and f) positive future outlook. At 12 months following the initial ED visit, the participants' medical records were reviewed to identify any subsequent ED visits for injury-related complaints. We analyzed data with chi-square and logistic regression analyses.

Results: Three hundred thirty-two patients were approached, of whom 300 patients consented. Participants' average age was 21.1 years, with 60.1% female, 86.0% African American. After controlling for participant gender, ethnicity, or injury complaint at time of first visit, return visits for injuries were significantly associated with: hostile/aggressive feelings (Odds ratio (OR) 3.5, 95% Confidence interval (CI): 1.3, 9.8), self-reported perceived likelihood of violence (OR 10.1, 95% CI: 2.5, 40.6), and peer group violence (OR 6.7, 95% CI: 2.0, 22.3).

Conclusion: A brief survey of risk factors for violence is predictive of increased probability of a return visit to the ED for injury. These findings identify a potentially important tool for primary prevention of violent injuries among at-risk youth seen in the ED for trauma-related and non-traumatic complaints. [West J Emerg Med. 2014;15(5):609–614.]

INTRODUCTION

Violent injury is a disturbingly common phenomenon among North American youth. Injuries due to violence are the second leading cause of death among adolescents aged 15–19[1] and accounted for over 600,000 visits to U.S. hospitals in 2008.[2] The consequences of violence during the adolescent and young adult years go far beyond the physical injuries, and include depression, post-traumatic stress disorder (PTSD), substance use, and poor academic achievement. Furthermore, several studies suggest that non-fatal violent injuries in adolescents often precede fatal violence and homicides,[3,4] a fact that underscores the importance of identifying at-risk youth before violence escalates.

Emergency departments (EDs) are an important societal safety net, serving patients who are acutely ill or are unable to obtain medical care through other clinical settings.[5] In many communities, EDs are the only providers of medical care for patients who are uninsured or under-insured.[6] Due to this unique role of EDs in our society, they have been identified as important sites for screening and prevention of public health problems. Examples of public health interventions that have been implemented via ED-based screening and education/prevention efforts include: HIV testing and education,[7] screening and interventions for victims of Intimate Partner Violence,[8] as well as risky drug/alcohol use.[9]

In several communities across the U.S., EDs and trauma departments have implemented interventions aimed at preventing future violence among youth who present after a violent injury.[10] However, it is important to note that the majority of ED-based violence-prevention programs have focused on secondary and tertiary prevention of violence, enrolling patients only after an initial hospital visit due to violence, with only 1 published study that focused on primary prevention of peer aggression and violence among patients presenting to the ED, regardless of presenting complaint.[11]

In this study we sought to determine if specific violence risk factors could be used to identify young adults at risk for an ED visit for an injury-related complaint over a 1-year period after an initial ED visit for any complaint (trauma-related or non-trauma-related) to allow targeted use of violence prevention resources and services.

METHODS

Study Design

This study utilized a prospective cohort design, using an initial survey of risk factors among patients presenting to the ED for any complaint, with follow up at 12 months via electronic medical record review.

Setting

Enrollment took place in the ED of a large, urban safety-net hospital in the Southeastern U.S. The ED sees over 105,000 patient visits annually. During the time this study was completed, this ED served as the metropolitan region's only Level I trauma center and its only public hospital.

Protocol

Eligible patients were 18–24 years old, presenting to the ED for any complaint during study hours. Patients were excluded if they were critically ill, incarcerated, had an acute psychiatric emergency, or if they were unable to read or write in English.

A research assistant (RA) approached all eligible patients, and informed them about the study. The research assistant had a master's degree in public health, and received specialized training about clinical research ethics and study subject recruitment. The RA was present in the ED for 8-hour shifts, 3 to 5 days per week, from June through December 2009, varying to include weekends and weekdays, and to include patients presenting during the day as well as the evening.

The questionnaire was composed of 6 different survey instruments, which were selected based on survey risk factors identified in the literature as being associated with increased risk of violence.[12] The survey has previously been described in our initial study.[13] Briefly, we assessed: Hostile/aggressive behavior, using the Hostility portion of the Product-Symptom Checklist-90.[14] Self-perceived likelihood of violence, and recent history of violent behavior were measured using Likelihood of Violence and Delinquency Scale and Aggressive Behavior Scales of the Sage Baseline Survey, respectively.[15] We assessed peer-group violence using the Friend's Delinquent Behavior scale from the Denver Youth Survey,[16] and exposure to community violence was assessed using the Children's Exposure to Community Violence survey.[17]

The full survey instrument consisted of a 6-page multiple-choice survey, which required approximately 10–15 minutes for completion. The RA was trained to approach patients only during natural periods of waiting during the ED visit (in the waiting room, while awaiting transport for a test, or while awaiting a test result); the survey was administered either in a private patient care area, or, if the patient was in the waiting room, they were escorted to an adjacent private area to complete the survey. Participants were offered a $5 gift certificate to compensate for their time.

We classified participants as high or low risk according to previously described methods.[13] We defined "high risk" exposure as a response higher than the midpoint on a given scale, e.g., 4 or greater out of 5 possible responses on more that 50% of items within a given assessment.

We performed follow up via medical record review at 12 months following the index visit. For completion of record review, the patients' electronic medical records were reviewed to determine whether they had had any subsequent return visits to the ED, and, if a visit had occurred, whether that visit was due to an injury-related complaint. Designation of visits as injury-related vs. non-injury related was made based on review of a) chief complaint as recorded by the triage nurse, b) history of

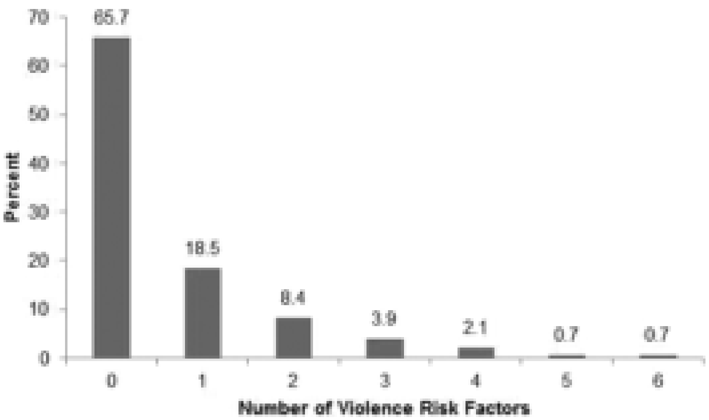

Figure. Co-occurrence of violence risk factors among 286 patients in a Southeastern emergency department.

present illness as recorded by the physician(s) caring for the patient, and (c) final diagnosis/diagnostic code. If any of these elements suggested that the patient's visit had been prompted by an injury, we counted the patient as an "Injury Visit." Review of all charts was completed by two emergency physicians based on pre-determined diagnostic criteria, and inter-rater reliability was calculated. Due to limitations in patient disclosure and clinician documentation (Rodriguez, 1999), we did not attempt to discriminate between intentional versus unintentional etiology of injury.

Statistical Analysis

We analyzed data using SAS 9.3 (SAS Institute, Inc., Cary, NC). We used logistic regression to estimate the odds ratio (OR) of return visit for injury comparing those with and without violence risk factors. A multivariate analysis using logistic regression was performed to estimate the OR of return visit for injury while controlling for potential confounding by known risk factors for violence, including gender, race/ethnicity (specified as Non-Hispanic Black versus other), and initial ED visit for violence. Inter-rater reliability for chart review results was determined using Cohen's kappa statistic calculation.

RESULTS

The RA approached 332 patients, of whom 300 patients consented; medical record abstractions were performed on 286 of these patients. (We excluded14 patients because their medical chart could not be located – a hospital-wide transition from paper charts to electronic medical records was completed between the initial survey and follow-up completion, and may have contributed to loss of some follow-up data). Among the 286 patients, participants' average age was 21.1 years, with 167 (60.1%) female, 240 (86.0% Non-Hispanic Black, 15 (5.4%) Non-Hispanic White, and 11 (4.7%) Hispanic. One-hundred eighty-eight (34.3%) participants reported a high rate of exposure to at least one risk factor for violence, as measured by the survey instrument (Figure). When evaluated by specific risk categories, 42 (14.7%) participants reported hostile or aggressive impulses, 15 (5.2%) reported that they anticipated that they would participate in violent behavior in the near future, and 17 (5.9%) participants reported recent participation in violence. Twenty-three (8.0%) participants reported exposure to high rates of peer group violence, 62 (21.7%) participants reported exposure to high rates of community violence, and 21 (7.3%) reported a negative future outlook (Table 1).

Table 1. Demographic and violence risk factors among 286 patients presenting to a Southeastern emergency department and included in the analytic cohort.

Variable	Number (%)
Female	167 (60.1)
Race/ethnicity	
Non-Hispanic black	240 (86.0)
Non-Hispanic white	15 (5.4)
Hispanic	13 (4.7)
Other	11 (3.9)
Initial presentation for injury	53 (19)
Violence risk factors	
Hostile/aggressive impulses	42 (14.7)
Perceived likelihood of violence	15 (5.2)
Violence behavior in the recent past	17 (5.9)
Peer group violence	23 (8.0)
Community exposure to violence	62 (21.7)
Negative future outlook	21 (7.3)

Of the 286 participants initially enrolled in the study, based on medical record review at 12 months following initial visit, 62 (21.7%) patients were seen for repeat ED visit during the follow-up period, with 18 (6.3%) seen in the ED for a visit due to an injury-related complaint during the 12 month follow-up period. Inter-rater reliability for the return visits analysis was excellent, with a kappa >0.9.

Return visit for injury at 12 months was positively associated with high risk factor exposure at the initial ED visit. When adjusted for ethnicity, sex, and presenting complaint, patients who reported high rates of hostile/aggressive feelings showed an odds ratio of 3.5 (95% Confidence Interval [CI]: 1.3, 9.8) for return injury visit, compared with those who did not show high rates of hostile/aggressive feelings. Participants who reported a high likelihood of future violent behavior showed an odds ratio of 10.1 (95% CI: 2.5, 40.6) for return injury visit. We also observed a statistically significant relationship with patients who reported peer group violence (OR 6.7, 95% CI: 2.0, 2.3); recent violent behavior was just below the threshold for statistical significance (OR 3.9, 95% CI: 1.0, 15.9) (Table 2).

Table 2. Odds ratios and 95% confidence intervals for return visit for injury complaint at 12 months when controlling for sex, ethnicity, and participant presenting complaint category (injury vs. non-injury complaint).

	Unadjusted odds ratio (95% confidence interval)	Odds ration when controlling for sex, ethnicity, and presenting complaint (95% confidence interval)
Hostile/aggressive impulses	4.2 (1.5, 11.7)*	3.5 (1.3, 9.8)*
Perceived likelihood of violence	6.7 (1.9, 23.6)*	10.1 (2.5, 40.6)*
Violence behavior in the recent past	3.63 (0.9, 14.0)	3.9 (1.0, 15.9)
Peer group violence	5.34 (1.7, 16.7)*	6.7 (2.0, 22.3)*
Community exposure to violence	1.03 (0.3, 3.3)	1.2 (0.4, 4)
Negative future outlook	2.78 (0.7, 10.5)	2.5 (0.6, 10.0)

* Indicates $p<0.05$ (total patients: 286, total returned for repeat injury visit: 62 patients [21.7%]).

DISCUSSION

This study assessed the correlation between patients' responses to a written survey about exposures to risk factors for violence with those patients' risk of returning to the ED for an injury-related complaint in the subsequent 12 months. We found that patients' report of risk factor exposure was strongly predictive of a return visit for an injury complaint, and that the relationship between survey results and injury visit remained significant even when controlling for factors traditionally associated with injury, including sex, race, and reason for initial ED visit.

With respect to specific risk factor exposures, we found that peer group violence, self-reported likelihood of future violence, and responses on a scale of hostile/aggressive impulses were all significantly associated with risk of repeat visit for violence, whereas community exposure to violence, report of violent behavior in the recent past, and negative future outlook were not significantly associated with risk of repeat visit for injury. Much of the existing literature about trauma recidivism has previously focused on demographics and on characteristics of the initial traumatic event – such as mechanism of injury, rather than individual risk factor exposure among patients.[18–21] One small, single-site study did descriptively assess characteristics of young adults who were seen for a repeat incident of trauma within a 4-year span, and identified living "in a neighborhood where crime is pervasive" as a common characteristic, but did not compare the group with recurrent violence with patients who had presented for only a single violent injury.[22] Another study, using a sample of 100 adolescent and young adult trauma victims, did find factors including use of weapons, history of fighting, and past arrests to be associated with increased risk of firearm injury versus other causes of injury, and "use of alcohol on weekdays, past arrest, and higher education levels" to be associated with recurrent injury.[23] The high prevalence of reported exposure to community violence across patients who did and did not experience repeat injury visits might mask more subtle differences in exposures to community violence and/or presence of "safe havens" in some communities that may ameliorate the effects of community violence exposure. Additionally, self-report of recent violent behavior, while not statistically significant in this sample, does show a trend towards an effect; given the small sample size, and potential patient concerns about disclosing recent violence perpetration, this relationship might be predictive of repeated injury visits in a larger cohort, and/or if patients are more confident of the confidentiality of information disclosed through the survey, such as if the survey were administered through a computer interface rather than on paper.[24]

These findings suggest the potential for the use of the risk factor survey as a means of identifying youth at risk for future injury, and for directly targeting those youth at risk for violent injury.

Compared to untargeted interventions, prevention interventions that focus on patients who screen positive for the risk factors studied would allow for a more focused use of resources and would allow clinicians and social service agencies to provide services focused specifically on those individuals at highest risk for violent injury.

LIMITATIONS

This study faces several limitations. First, the study was conducted at a single ED, situated in the inner city of a large city; further, multi-site studies would be necessary to determine the extent to which these finding would generalize beyond the study population. Although this study is limited by the geographical setting of the study site, it is important to emphasize the importance of understanding and addressing the causes of violence in settings like the study site. Public hospitals in large urban centers treat patients at high risk for violent injuries, and focusing prevention efforts in these settings has the potential for broad impact on rates of violent injury in the U.S.

An additional limitation is the use of medical record data to identify return visits for injury complaints. While this method faces the risk of patients being lost to follow up if a patient was seen at another hospital for an injury complaint, this method was chosen because it offered more accurate and inclusive follow-up data at 12 months, when compared with alternative methods, such as follow up via personal surveys or via the trauma registries. While patients may have been lost to follow up due to injury visits to other EDs, the probability of loss to follow up was mitigated by the choice of a study site that served as the only public hospital and the only Trauma 1 Center serving the metropolitan area. When considering potential missed patients in the medical record follow up, it is unlikely that there would have been a systemic bias in losses to follow up which would have biased the findings of this study.

Finally, a relatively small number of patients (6%) of the total sample returned for an injury visit at one year following initial visits. While this number was enough to find statistically significant relationships, repeating the study with multiple sites and a larger initial sample would allow for narrower confidence intervals, a more precise assessment of relative risk relationships, and a better understanding of the observed relationship between the risk factors and the injury outcome. Additionally, a relatively small number of patients in the original sample reported risk factor exposure, again suggesting a benefit to studying this survey's predictive value in a larger patient population or across multiple clinical sites.

CONCLUSION

In this study we found a high correlation between ED patient's reports of exposure to risk factors for violence (including peer group violence, self-assessed risk of future violence, and hostile/aggressive feelings) and return visit to the ED for injury complaints, with odds ratios ranging from 3.5 to 10.1. These findings remained significant even when controlling for patient gender, ethnicity, and patient complaint at initial visit (i.e., injury vs. non-injury complaint). These findings suggest a new approach to studying risk factors for repeat ED visits for traumatic injuries among young adults seen in the ED, and suggest a novel approach by which EDs and/or trauma services might identify a high-risk population that might benefit from targeted interventions to prevent injuries before they occur. Future research should explore how these separate scales or items from the scales may be combined to optimally identify this high-risk population.

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Effects of a Web-based Educational Module on Pediatric Emergency Medicine Physicians' Knowledge, Attitudes, and Behaviors Regarding Youth Violence

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Introduction: Youth seen in the emergency department (ED) with injuries from youth violence (YV) have increased risk for future violent injury and death. Pediatric emergency medicine (PEM) physicians rarely receive training in, or perform, YV screening and intervention. Our objective was to examine effects of a web-based educational module on PEM physicians' knowledge, attitudes, and behaviors regarding YV screening and interventions in the ED.

Methods: We invited all PEM fellows and attendings at an urban Level I pediatric trauma center to complete an interactive web-based education module (and 1-month booster) with information on YV's public health impact and how to screen, counsel and refer YV-involved patients. Consenting subjects completed electronic assessments of YV prevention knowledge and attitudes (using validated measures when possible) before and after the initial module and after the booster. To measure behavior change, chart review identified use of YV-specific discharge instructions in visits by YV-injured PEM patients (age 12–17; identified by E codes) 6 months before and after the intervention. We analyzed survey data were analyzed with Fisher's exact for binary outcomes and Kruskal-Wallis for Likert responses. Proportion of patients given YV discharge instructions before and after the intervention was compared using chi-square.

Results: Eighteen (67%) of 27 PEM physicians participated; 1 was lost at post-module assessment and 5 at 1 month. Module completion time ranged from 15–30 minutes. At baseline, 50% of subjects could identify victims' re-injury rate; 28% were aware of ED YV discharge instructions. After the initial module and at 1 month, there were significant increases in knowledge ($p<0.001$) and level of confidence speaking with patients about avoiding YV ($p=0.01$, $df=2$). Almost all (94%) said the module would change future management. In pre-intervention visits, 1.6% of patients with YV injuries were discharged with YV instructions, versus 15.7% in the post-intervention period ($p=0.006$, 95%CI for difference 3.6%-24.5%).

Conclusion: A brief web-based module influenced PEM physicians' knowledge and attitudes about YV prevention and may have affected behavior changes related to caring for YV victims in the ED. Further research should investigate web-based educational strategies to improve care of YV victims in a larger population of PEM physicians. [West J Emerg Med. 2014;15(5):615–622.]

INTRODUCTION

Youth violence, referring to conflict between adolescent or young-adult peers, leads to over 700,000 emergency department (ED) visits annually in the United States.[1] Youth presenting to the ED with injuries from violence have greatly increased risk for future violent injury and death.[2,3] Indeed, preventing further violence may be more critical than any immediate clinical care.[4,5] The American College of Emergency Physicians[6] and the American Association of Pediatrics[7] both have policy statements calling for improved identification, counseling, and referral of victims of violence. Identified core competencies for health professionals also include knowledge of youth violence (YV) as a public health problem, the role of physicians in YV assessment and prevention, and physicians' involvement in hospital or community prevention organizations.[8]

Risk assessment, counseling, and discharge planning during a hospital visit for violent injury has been shown to be effective preventative practices.[9] The time immediately following a YV-related injury, specifically, has been recognized to be a "teachable moment," when youth and parents are more accepting of intervention, with decay of this opportunity observed as time passes.[10] Although studies demonstrate efficacy of brief ED-based interventions to reduce YV re-injury, as well as risk factors for violence such as alcohol use,[11,12] such comprehensive programs are often logistically difficult for EDs. At a minimum, improved discharge planning and provision of resources to YV victims have been encouraged by specialty societies and expert consensus;[13] according to some studies, such interventions may be helpful for violence victims in some populations.[14,15]

YV prevention behaviors, however, are not routinely preformed in practice. In one study, emergency medicine (EM) physicians reported infrequent assessment of re-injury risk or referrals to community resources for pediatric patients who present with YV injuries.[16] Specialties outside of EM share this deficiency in addressing YV. A national survey found that less than 20% of internists and surgeons engage in firearm counseling, and pediatrician surveys demonstrate that screening for YV or weapon carrying is rare.[17–19] Physicians receive little training in public health interventions against violence; in a sample of ED directors surveyed, only 17% reported formal staff training on YV.[20]

Prior training in YV prevention has been shown to be a major determinant of execution of YV counseling and prevention behaviors.[19] Correspondingly, lack of training is a commonly cited barrier to YV prevention efforts, and physicians identify staff education as a mode to improve behaviors.[16] Rigorous violence prevention courses, ranging from 3 to 15 hours, have been shown to be effective in increasing physicians' skills; however, such a time-intensive format is neither feasible nor sustainable for the average practicing physician.[21–23] Moreover, the majority of physician interventions have been aimed at outpatient providers, neglecting providers in the acute care setting.[21–23]

When designing interventions targeted toward physician behaviors, it is most effective to use established theories of behavioral change. Specifically, the theory of planned behavior (TPB) is a commonly used construct that has been to shown to correlate with physician behavior change.[24–26] The theory suggests that a person's behavior is predicted by his/her intention to perform the behavior, which depends on his/her attitude toward the behavior, subjective norms, and perceived behavioral control.[27]

This study aimed to develop a theoretically-driven, short web-based educational program and examine its effect on pediatric emergency medicine (PEM) physicians' knowledge, attitudes and behaviors regarding YV victims' needs in the ED. We hypothesized that the educational intervention would lead to significant increases in physicians' knowledge about YV, self-reported efficacy in addressing YV, and use of YV-specific discharge instructions, in accordance with the TPB.

METHODS

Study Design

This was a study of a web-based educational intervention (see Figure 1). An interactive, web-based YV education "Core Module," designed to be approximately 30 minutes in length, followed by a 10-minute "Booster Module" 1 month later, was administered to consenting participants. Pre- and post-module surveys assessed participants' knowledge and attitudes regarding YV and YV prevention. As a proxy for physician behaviors, we compared group-wide use of appropriate violence prevention discharge instruction/referral sheets for adolescent patients with violence-related injuries during the 6-month time period prior to and following the completed (core module plus booster) intervention.

Study Participants and Setting

The study took place at 1 large urban children's hospital in the Northeast. This institution is the only Level 1 Trauma Center in the state and its catchment area includes portions of the 2 neighboring states. The pediatric ED located within the children's hospital sees over 50,000 patients yearly. Board-certified PEM physicians supervise all EM and pediatric residents who rotate through the pediatric ED, as well as nurse practitioners who staff the ED.

All PEM attending physicians (n=21) and fellows (n=6) were invited to participate via email. We excluded EM physicians who work occasional shifts in the pediatric ED, yet are not PEM-trained, along with "fast-track" pediatricians, nurse practitioners, residents, and ED nurses. This group was selected to provide a sample of physicians who: a) work primarily in the pediatric ED, b) are most likely to care for pediatric trauma patients, and c) play supervisory roles to residents and nurse practitioners. The first page of all electronic surveys included an informed consent page, which noted that

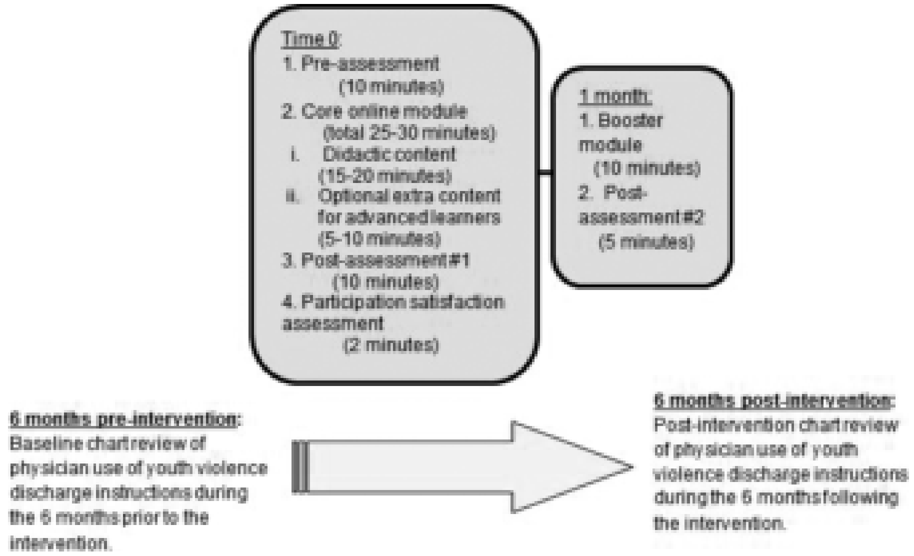

Figure 1. Study overview and timeline.

continuation with the survey implied agreement to participate; a formal written consent process was waived. Approval for the study was granted by the hospital institutional review board.

Educational Intervention

The Core and Booster Modules were internally developed by the authors, based on health professionals' core competencies of YV prevention and expert review.[28,29] Modules were created based on the TPB/Reasoned Action, a theory describing how changes in attitudes, beliefs about subjective norms, and perceptions of behavioral control lead to alterations in behavioral intentions; as a result, behavioral change occurs.[30] We developed the modules using an e-learning software program ["Articulate"], which uses interactive slides with text and graphics along with audio-narrative. After development, they were piloted with topical experts outside the study institution and modified based on their feedback.

The Core Module was divided into 4 sub-modules: 1) Background, 2) History and assessment, 3) Communicating effectively, and 4) Discharge planning. Each sub-module began with learning objectives and concluded with a summary slide and brief, 1 to 2question quiz. Sub-modules 1 through 3 included content on YV risk factors, morbidity and mortality statistics, re-injury rates, tools to focus the patient history and guide counseling, and use of the ED visit as a teachable moment. The Discharge Planning sub-module included information about available ED discharge resources. Optional extra content was included for advanced learners, consisting of additional screening tools, safety tips, and YV information specific to the region. The Core Module was expected to take 25 to 30 minutes to complete.

The Booster Module was administered one month later and consisted of key points drawn from the Core Module, on 20 slides with text, graphics, and audio-narrative. The Booster was designed to require no more than 5 to 10 minutes.

Outcome Measures

Survey Data: Based on existing literature and expert consultation, we developed pre- and post-module web-based tests of knowledge, attitudes and behaviors regarding YV, and satisfaction with the educational program .[31] Survey design was based on the TPB/Reasoned Action. We adapted individual survey questions and scales from previously validated surveys.[16,32–34] Questions pertained to knowledge, attitudes, and behaviors, specifically: knowledge of YV morbidity and mortality statistics, knowledge of preferred tools and strategies to identify and counsel YV victims, knowledge of existing resources, specifically YV-specific discharge instructions, attitudes about the preventability of YV and the appropriateness of performing referrals in the ED, endorsement of current referral practices/ self-reported behaviors regarding treatment and referral of patients with YV-related injuries, and assessment of the educational value of the module itself. The survey instruments were piloted with EM and pediatric residents and revised based on feedback and redundant items.

Behavioral Data: We included for review charts of patients ages 12 to 17 seen in the pediatric ED with YV-related intentional injuries during the 2 6-month periods treated for YV-related injuries by all PEM attendings and fellows (n=27). We identified these charts using E-codes corresponding to physical violence (E960-969, excluding diagnoses codes related to sexual assault or rape (E960.1) and child abuse (E967s)). Because participation in the educational intervention was anonymous, we did not limit the chart review to patients seen by those who completed the educational module. The study was designed in this way to maintain the anonymity of the

Table 1. Summary of youth violence prevention discharge resources.

Content category	Example/description
Motivation to access resources after discharge	Example: "If you are experiencing violence in your life, you do not need to deal with it alone. There are programs and organizations…"
Community-based resources	Types of resources/programs: After-school programs Counseling/mental health Crisis intervention Legal resources Faith based Community-based violence intervention programs
Conversation prompts (drawn from American Association of Pediatrics recommended questions)	Example: "Is the conflict settled?" "Do you feel safe leaving the hospital?"
Opportunity for additional support prior to leaving the hospital	Example: "…please ask your doctor or nurse if you can talk to a clinical social worker."

survey participants and to minimize a potential bias due to loss to follow up.

Each chart was screened for the use of YV-specific discharge instructions, with results reported as proportions of patients that received YV instructions for the time periods before and after the module administration. Table 1 summarizes the content of the study institution's YV prevention discharge instructions. This search resulted in 85 patient charts for the first 6-month period and 76 patient charts for the second 6-month period. Two of the authors reviewed charts and excluded any charts for which a) a non-PEM attending was listed as the attending of record (16 patients); b) the patient was either admitted to the hospital or transferred to another facility (12 patients); c) discharge diagnosis clearly noted sexual or child abuse as the nature of the injury (16 patients); or d) the patient eloped prior to receiving discharge paperwork (4 patients). Both reviewers reviewed 10% of charts; inter-rater agreement on inclusion/exclusion designation and discharge instruction usage was 100%.

Data Analysis

Using STATA version 12.1 (College Park, TX),[35] we calculated descriptive statistics (counts, means, proportions) to characterize the overall study population and participation in each part of the study. Kruskal-Wallis test and Fisher's Exact test, for Likert data and binary data respectively, were used to compare scores in knowledge, self-reported attitudes and behaviors. We used Chi Square test to compare frequency of YV discharge instruction use before and after the intervention

RESULTS

Study Participants

Of 27 PEM physicians invited to participate, 67% ($n = 18$) participated in the pre-assessment and core module. Seventeen participants (63%) completed the post-module assessment, and 12 (44%) completed the 1-month booster module and assessment. Of participants completing the pre-assessment questions, 44% (n=8) were women and 83% (n=15) were white. Over half of the participants (n=10, 55%) were between 30 and 39 years old. In terms of years of experience, 28% (n=5) of the sample were PEM fellows, 17% (n=3) had less than 5 years of experience as an attending, 28% (n=5) had between 6 and 10 years of experience as an attending, and 28% (n=5) reported being an attending for over 10 years. See Table 2 for all participant characteristics. The demographics were similar to the overall PEM attending and fellow group.

Module Completion

Time to complete the core module ranged from 15 to 30 minutes with a mean completion time of 24 minutes. Ninety-four percent (n=16) of the participants found the module easy to use, and 82% (n=14) reported that they would recommend the module to other physicians.

Assessment of Knowledge

Baseline YV knowledge of participants was low and improved significantly after the module. Initially, the proportion of participants who answered all knowledge items correctly, including YV victims' re-injury rates and awareness of YV discharge resources, was only 11%, versus 100% post module and 83% at the 1-month assessment ($p<0.001$). Prior to the intervention, 28% (n=5) of participants reported knowledge of the YV discharge instructions; this increased to 100% immediately after viewing the module and remained at 100% at the 1-month assessment ($p<0.001$). See Figure 2 for the results of individual knowledge questions before and after the intervention.

Table 2. Characteristics of pediatric emergency medicine (PEM) physicians who completed web-based modules on youth violence.

Characteristic	% (n=18)
Women	44% (8)
Race/ ethnicity	
White	83% (10)
Hispanic	17% (2)
Age	
30 to 39	55% (10)
40 to 49	33% (6)
Over 50	11% (2)
Years of experience	
PEM fellow	28% (5)
<5 years as attending	17% (3)
6–10 years as attending	28% (5)
>10 years as attending	28% (5)

Assessment of Attitudes, Norms, and Perceived Behavioral Control

More participants felt confident having conversations about violence prevention after completing the module (50% pre-assessment versus 76.5% immediately post intervention and 75% at 1 month assessment, p=0.01, df=2). Non-significant positive trends were observed in the number of participants who felt that their discharge plans make an impact (55.5% pre, 76.5% post, 92% 1-month, p=0.19, df=2), that PEMs play an important role in YV prevention (72% pre, 82% post, 92% 1-month, p=0.45, df=2) and that PEMs are expected to provide YV prevention information at discharge (89% pre, 94% post, 92% 1-month, p=0.18, df=2). Almost all participants (94%) felt the module would change their future management of YV-injured patients.

Assessment of Behaviors

Self-Report. When participants were asked about their behaviors before the module and at the 1-month assessment, there were no significant differences in the proportion of participants reporting that they ask about plans for retaliation, consult a social worker, or give YV discharge instructions (Tables 3, 4).

Observed Behaviors. In our assessment of group-wide PEM physicians' behaviors, however, provider behaviors changed significantly post-intervention. We identified 62 patients treated by PEM attendings or fellows for YV-related injuries in the 6 months prior to the intervention, compared with 51 patients in the 6 months after the intervention. Prior to the intervention, 1.6% (n=1) of patients with injuries from YV were discharged with YV instructions, versus 15.7% (n=8) in the post-intervention period (p=0.006, 95%CI for difference 3.6% to 24.5%) (Tables 3, 4).

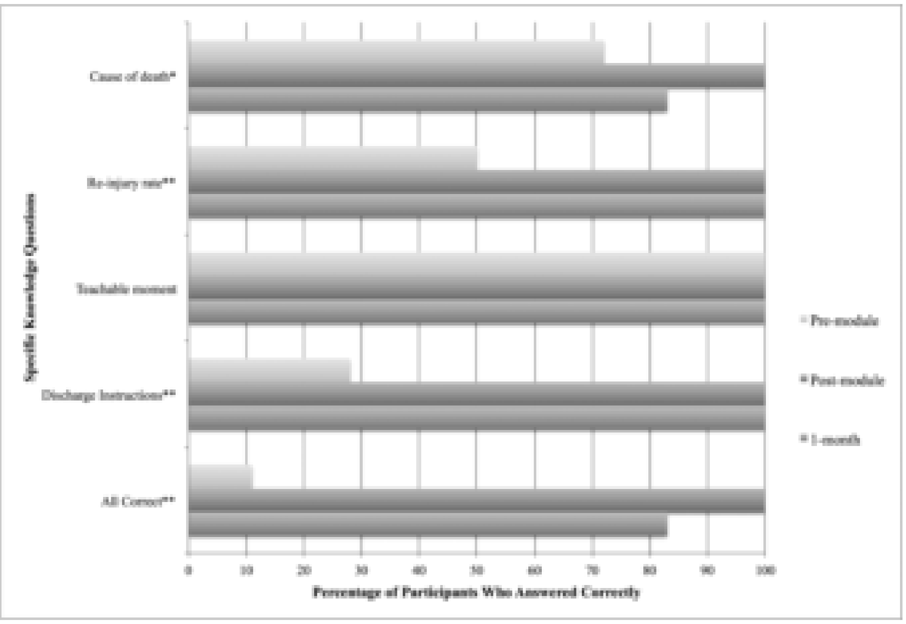

Figure 2. Percentage of participants correctly answering youth violence (YV) knowledge questions. * $p<0.05$ between pre-module and post-module assessments, ** $p<0.001$ between pre-module, post-module, and 1-month assessments. To answer multiple choice questions correctly, participants had to identify that YV is the 2nd leading cause of death among 15–24 year-olds in the United States, that 44% of youth admitted to a trauma center for violent injury have re-injury within 5 years, that emergency department (ED) visits are teachable moments during which youth are more open to discussions about violence prevention, and that YV discharge instructions are available using the study institution's ED discharge software.

Table 3. Self-reported changes of physicians who completed the modules.

Self-reported behavior	Pre-intervention % (n=18)	1-month assessment % (n=12)	p-value (df)
Ask about retaliation	33% (6)	58% (7)	0.24 (1)
Consult social work	33% (6)	50% (6)	0.69 (1)
Discharge patients with YV instructions	22% (4)	33% (4)	0.55 (1)

df, degrees of freedom; *YV*, youth violence

DISCUSSION

A web-based educational module designed to improve YV knowledge, change attitudes and norms about the effects of ED YV interventions, and increase provider use of YV-specific discharge instructions, was effective in increasing knowledge and changing attitudes among a group of PEM physicians. After implementation of our module, group-wide use of YV prevention discharge instructions increased.

In many ways our results are supportive of previous literature. Only a small percentage of PEM physicians employed YV-specific discharge instructions and community referrals at baseline; this finding is consistent with prior investigations showing low rates of YV prevention strategies among physicians across specialties, including in the ED.[16,18,19] Previous studies also indicate that clinicians with more training in YV prevention strategies are more likely to use these strategies in clinical practice; our findings of increased use of YV discharge instructions after the educational module support this.[18,21]

Physicians' increased use of YV prevention discharge instructions may be a result of our initial web-based intervention and booster module; other explanations for behavioral changes, however, should be explored. PEM physicians may have been made more aware of YV-specific discharge instructions because of invitations to participate in the study. Alternatively, physicians that did not complete the web-based module may have been influenced by the practice patterns of their colleagues who completed the educational module. Both of these explanations could have contributed to the group-wide increase in the use of the discharge instructions given previous literature suggesting that increased knowledge of available resources is associated with increased use of YV prevention strategies.[19] It is also possible that the change in behavior was seen only among physicians participating in the module, and that our results are less significant than they would be had we limited the behavior assessment to study participants. Finally, it is not clear how important the 1-month booster module was in changing participant behaviors given the significant attrition rate between the initial module and booster module. These explanations could be investigated in future studies.

Our findings are novel in that we used a short web-based module to increase the use of YV prevention information and community referrals at discharge compared to previous studies investigating longer and more rigorous violence prevention courses.[21–23] This web-based program offers a number of advantages compared to traditional instruction that makes it feasible for wide and rapid dissemination. The program cost very little to create and would cost little to maintain; it can be administered across institutions with high fidelity; its interactive format makes it naturally engaging for the learner; and, as an asynchronous learning tool, can easily be integrated into an existing curriculum.

Our study is also unique in that we measured an objective outcome, use of YV-specific discharge instructions for ED patients, as opposed to only measuring self-reported attitudes and behaviors as in other YV studies.[16,18,19] Furthermore, our findings are generally supportive of the Theory of Planned Behavior as an effective method of changing physicians' behaviors.[30,36–39] After taking the module, participants had increased confidence conversing with youth about violence (representing increased perceived behavioral control) and reported intentions to change behavior around youth violence prevention. According to the Theory of Planned Behavior, intent and perceived behavioral control are the two most important predictors of behavior change.[30,37,38] Though we did include some non-participants in our measurement of observed behaviors, the anticipated behavior change was observed

Table 4. Objective behavioral changes of physicians who completed the modules.

Objective behavior	6 month period prior to module % (n=62)	6 month period after module % (n=51)	p-value
Use of YV discharge instructions for patients with YV-related injuries	1.6 (1)	15.7 (8)	0.006*

YV, youth violence
* $p < 0.01$

among PEM physicians group-wide; physicians changed their behavior by using YV discharge instructions more frequently.

Despite the high frequency of ED visits related to YV, ED providers receive little formal training in YV intervention methods; only 17% of EDs offer formal instruction in YV intervention strategies.[16,18,40] Our study suggests that the use of a brief, web-based educational module among PEM providers might be an effective method of increasing YV knowledge, changing attitudes, and increasing the use of YV prevention methods including discharge planning and referrals to community resources.

LIMITATIONS

Our study has several limitations. The study was conducted in a single pediatric ED within a large urban academic institution with both a residency and a PEM fellowship. Additionally, we only invited PEMs to participate. These factors may limit the generalizability of our study. One could speculate that physicians working in such an institution are more likely to change their behaviors as a result of an educational module. To confirm generalizability, further studies of this intervention should be performed with EM physicians not trained in pediatrics and in both adult and community EDs.

Our findings of behavioral change among physicians are limited by the inclusion of physicians who did not complete the web-based module. As discussed above, because we measured group-wide use of YV prevention discharge instructions and not just those who participated in the module, it is possible that factors other than our intervention were responsible for the increased use of YV discharge instructions. However, no other YV-related interventions were ongoing in our hospital at the time of our study. Moreover, we would expect that the inclusion of behavioral assessments for physicians who did not complete the module would bias our results toward the null hypothesis.

Another limitation of our study is loss to follow up of 6 participants between the initial module and the 1-month assessment. Those who completed the entire study may have been more motivated to change their behaviors as a result of the module, resulting in a possible bias. To minimize the effect of such a bias, the intervention should be studied in a larger group of physicians and take steps to minimize loss to follow up. Mitigating this effect, however, was our measurement of objective data across the entire group of PEM physicians, study responders and non-responders alike.

Other limitations include a lack of data on physicians' reasons for not using YV-specific discharge instructions and a lack of data regarding whether physicians continued to use the discharge instructions more frequently after the 6-month time period.

CONCLUSION

In conclusion, our study shows that a short web-based educational module has the potential to effectively increase PEM physicians' use of YV discharge instructions for YV victims treated in the ED. It also increases knowledge about how to screen and refer for youth violence. Future research should be conducted with larger samples of physicians in a variety of practice settings to confirm our findings and to identify whether use of YV prevention resources at discharge is effective at reducing future violent injury.

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Marginal Cost Analysis of Two Train-the-Trainer Models for Implementing SafeCare®

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INTRODUCTION

In adopting evidence-based practices (EBP), program administrators most frequently focus on program effectiveness. But there is growing recognition of the importance of program cost and of economic analysis for allocating scarce resources for prevention and intervention programs.[1] Economic analysis includes the assessment of programmatic costs using a micro-costing approach (precise individual resource valuation) to value the resources required to implement programmatic processes and activities so that programs can be compared to each other.[2–5] Differences in program cost are typically driven by differences in program length, staff requirements to implement the program and materials. However, another key source of program cost is the implementation strategy.

Program administrators must consider the costs to adopt or implement a program. Translation or implementation science focuses on the processes by which EBP are implemented. Less rigorous implementation procedures often fail to yield implementation with fidelity, which is needed to achieve program outcomes.[6] More rigorous strategies are more expensive, but there is evidence that they are needed to achieve implementation with fidelity.[7,8] Thus, the consideration of implementation costs is an important area of study. That is, just as intervention scientists have studied how much intervention is needed for behavior change, implementation scientists must study how much implementation is necessary to achieve fidelity.

To date, however, few studies have considered costs in implementation research,[9] and fewer still have specifically focused on the costs of implementing EBP in the field of child maltreatment (CM) prevention.[10] To our knowledge there are no studies that have calculated implementation costs for variants on a model and then related those costs to implementation outcomes. This paper presents a calculation of marginal implementation costs for 2 variants of a training program for the SafeCare® model, an evidence-based parenting model for child maltreatment prevention. SafeCare® has been disseminated to child welfare systems across 20 U.S. states.

The SafeCare® dissemination model includes a "train-the-trainer" component in which staff external to the purveyor (the National SafeCare® Training and Research Center [NSTRC]) are trained over time to train local staff. The training of trainers is notoriously difficult and often fails because of the lack of follow-up support.[11] In the study reported here, we trained trainers under 2 different models to examine the impact of trainee and client outcomes. A first step in understanding the impact of the 2 models is to calculate marginal cost differences in the 2 training models. The 2 training models differed primarily in their provision of support to new trainers following completion of the train-the-trainer program. Trainers were randomly assigned into 1 of 2 models for training, standard or enhanced. In the "standard" approach, the model includes a 5-day workshop with skill demonstration and proficiency improvement through role-playing activities and live training sessions. The model includes some ongoing support from NSTRC training staff, and in turn, trainers provide some support to the providers they train. The second model, the "enhanced" approach, provided extensive ongoing consultation from NSTRC training staff for 6 months upon completion of the trainer training workshop.

In this paper, we present data collected to determine marginal cost differences between the 2 models. Although we do not present data on implementation and client outcomes, this paper serves as an example of how data collection on this topic can be accomplished and how marginal costs are computed.

METHODS

This analysis considers those costs that are marginally different between the 2 train-the-trainer implementation models from the provider perspective. Costs for all training activities up through the initial workshop were not included, nor were all non-personnel costs such as space and supplies because those resources did not vary for the standard versus enhanced model. Where marginal resources, and therefore costs, were incurred between the 2 models was in personnel time required by NSTRC staff (the trainers in the model), trainers (those being trained), and coaches (those providing SafeCare® services who are directly supervised by the trainers). All time spent by personnel were prospectively assessed from weekly time diaries completed by trainers over 2 8-week periods across 2 different coaches between July 2010 and September 2011. We calculated total time required to implement the 2 training models by multiplying the average 8-week time costs of each model by 3.25 to assess total time for the 26-week (6-month) program. Activity categories included: providing fidelity monitoring, feedback, reviewing coaching sessions, preparation and tracking of fidelity, coach-led team meetings, other coach support (support other than routine fidelity monitoring feedback sessions documented under the feedback activity category), travel, and receiving support from NSTRC staff. These same time diaries provided information on the time spent by coaches from 2 of the activity categories (fidelity feedback and other coach support) and the time spent by NSTRC staff from one of the activity categories (support from NSTRC staff). We excluded from the analysis 2 trainers who did not participate for the full 8 weeks of data collection.

We calculated total costs for personnel time by using hourly wages plus fringe, if applicable, in 2011 U.S. dollars. Trainers received \$30 per hour with no fringe benefits. Coaches received \$34 per hour and NSTRC staff \$22 per hour, with an additional 27% in fringe benefits for each. All salaries and benefits remained constant throughout the intervention. Total costs were summarized at the personnel level (staff, trainer, or coach), activity level, and type of contact within most of the activity categories (in-person, by phone, or through email). We calculated significant differences in time and cost for each implementation model using t-test in Stata version 12.[12]

RESULTS

Table 1 reports the mean total personnel time by each train-the-trainer model: standard (n=12) versus enhanced (n=8), and by personnel and activity categories. Trainers in the enhanced model spent significantly more time compared to trainers in the standard model (33.59 versus 21.5 hours per trainer, p=0.025). This increased time was concentrated primarily in 2 activities, other coach support (12.94 vs. 8.08 hours per trainer, p=0.018) and support from staff (8.94 versus 2.64 hours per trainer, p=0.026). Trainers in the enhanced model also spent significantly more time than trainers in the standard model engaged in in-person time with coaches and staff (8.67 versus 1.49 hours per trainer, p=0.0023).

Table 2 reports the mean total cost of *all* personnel time by activity category. The mean total cost for the enhanced model was \$1,935 and \$1,171 for the standard model, a statistically significant difference of \$764 (p=0.010). Costs were significantly different for 2 activity categories, other coach support (\$943 versus \$589, p=0.018) and support from staff (\$518 versus \$153, p=0.026).

DISCUSSION

As child welfare systems move towards adopting evidence-based approaches for preventing child neglect outcomes, information on the costs of different implementation strategies will be essential. In this study, where an enhanced train-the-trainer model was compared to a standard model, the marginal cost differences between the 2 were significantly different but were not so different to make the enhanced model necessarily cost prohibitive from a programmatic perspective. These differences in costs are important when one considers widespread implementation and dissemination of the SafeCare® program, especially when comparing costs to outcomes.

A focus on costs of implementation methods begs the question of how rigorous implementation can be done at the lowest cost. One possibility for reducing implementation cost is via the use of technology and social media. Technology has a strong role to play both in delivering interventions to parents and in training and technical support provided to staff being trained.[13–16] Many purveyors of EBP have developed web-based training courses, reducing the need for expert trainers to conduct workshops.[17] Support following training may be conducted more effectively via telemedicine technologies that allow for real-time communication without the necessity of travel,[18] including the use of mobile technologies such as Skype or Facetime for services delivered in the home. Social media (e.g., Facebook) can also be used as support tool for trainers or providers in a learning community. The impact and cost of these technologies is largely unknown; however, if they reduce expert personnel time, they are likely to reduce overall costs.

LIMITATIONS

Several important limitations should be considered with the results of this study. First, while the methods used to compare costs can be applied to other EBP research, specific categories are only applicable to SafeCare. Second, the small sample size may have skewed the results making the findings of this study erroneous. Third, although critical for understanding the differences between different implementation strategies, this cost analysis does not allow us to assess the relative cost effectiveness of the standard versus enhanced train-the-trainer model. Thus, the next step in this research would be to compare

Table 1. Mean personnel time, in hours, for the standard versus enhanced implementation models implemented over a 6-month time period.

Trainer-reported time	Standard (n=12)	Enhanced (n=8)	p-value
Contact type			
Other	4.38	4.08	0.8794
In person	1.49	8.67	0.0023
Phone	8.85	13.16	0.1346
Email	6.92	7.69	0.724
Trainer activity			
Reviewing coaching sessions	3.81	3.52	0.858
Feedback	2.46	2.84	0.733
Prep and tracking	1.78	1.94	0.885
Coach-led team meetings	1.87	1.63	0.839
Other coach support*	8.08	12.94	0.018
Travel	0.86	1.79	0.405
Support from NSTRC†	2.64	8.94	0.026
Total trainer time‡	21.50	33.59	0.025
Coach time based on trainer report			
Feedback	2.27	2.62	0.733
Other coach support	7.46	11.94	0.018
Total coach time	9.73	14.56	0.018
Total NSTRC staff time based on trainer report	2.64	8.94	0.026
Total mean personnel time§	33.87	57.09	0.01

* Support other than routine fidelity monitoring feedback sessions documented under the feedback activity category.

† *NSTRC*, National SafeCare Training and Research Center.

‡ Trainer time by contact and activity add up to the same total.

§ The unit of analysis is the individual trainer. Total mean personnel time is the average total time associated with a trainer and other personnel (coaches and NSTRC Staff) involved in those activities.

marginal cost differences to marginal differences in outcomes between the standard and enhanced models. Specifically, it will be important to compare provider fidelity to the model (a key implementation outcome) and client behavior change to understand whether the enhanced model provides any value for its added cost. This will provide program purveyors and decision makers an accurate representation of the cost of incremental improvements in outcomes between the 2 models.

Table 2. Mean total costs per trainer (including trainer, coach and NSTRC staff time), by activity, for the standard and enhanced training models implemented over a 6-month time period in 2011 U.S. dollars.

	Standard (n=12)		Enhanced (n=8)		
Activity	Mean	Range	Mean	Range	p-value
Reviewing coaching sessions	$114	(0–276)	$106	(0–244)	0.857
Feedback	$179	(0–415)	$207	(0–711)	0.733
Prep and tracking	$53	(0–219)	$58	(0–163)	0.885
Coach-led team meetings	$56	(0–260)	$49	(0–146)	0.839
Other coach support	$589	(281–1,146)	$943	(336–1,359)	0.018
Travel	$26	(0–98)	$54	(0–293)	0.406
Support from NSTRC	$153	(0–675)	$518	(0–1202)	0.026
Mean total costs	$1,171	(809–2,066)	$1,935	(336–2,947)	0.010

NSTRC, National SafeCare Training and Research Center

CONCLUSION

This paper demonstrates cost differences between 2 different implementation models for training trainers in the EBP. Cost effectiveness of implementation processes is an important step for decision makers who wish to implement SafeCare®. Understanding the overall cost, the source of cost differences and the cost effectiveness of EBP will allow them to choose the best processes within a given budget for maximal impact.

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Call for Papers
2015 *Academic Emergency Medicine* Consensus Conference

Diagnostic Imaging in the Emergency Department:
A Research Agenda to Optimize Utilization

The 2015 *Academic Emergency Medicine* (*AEM*) consensus conference, **Diagnostic imaging in the emergency department: A research agenda to optimize utilization** will be held on May 12, 2015, immediately preceding the SAEM Annual Meeting in San Diego, CA. Original papers on this topic, if accepted, will be published together with the conference proceedings in the December 2015 issue of *AEM*.

Diagnostic imaging is integral and beneficial to the practice of emergency medicine. Over the last several decades, emergency department (ED) diagnostic imaging has increased without a commensurate rise in identified pathology or improvement in patient-centered outcomes. Unnecessary imaging results in increased resource use and significant exposure risks. ED diagnostic imaging has become the focus of many stakeholders, including patients and various regulatory agencies. This multidisciplinary consensus conference represents the first coordinated effort to further our evidence-based knowledge of ED diagnostic imaging. This consensus conference will formulate the research priorities for emergency diagnostic imaging, initiate a collaborative dialogue between stakeholders, and align this research agenda with that of federal funding agencies.

Consensus Goal:

The overall mission of the 2015 *AEM* consensus conference will be to create a prioritized research agenda in emergency diagnostic imaging for the next decade and beyond. The consensus conference will feature expert keynote speakers, panel discussions including nationally recognized experts, and facilitated breakout group sessions to develop consensus on research agendas by topic. Optimizing diagnostic imaging in the ED is a timely topic that is relevant to all who practice emergency medicine. Furthermore, the conference content spans many other specialties (e.g. radiology, pediatrics, cardiology, surgery, internal medicine), all of which will be invited to participate in the conference to optimize the agenda and for future collaboration in order to improve emergency diagnostic imaging use.

Consensus Objectives:

1. Understand the current state of evidence regarding diagnostic imaging utilization in the ED and identify opportunities, limitations, and gaps in knowledge of previous study designs and methodology
2. Develop a consensus statement that emphasizes the priorities and opportunities for research in emergency diagnostic imaging that will result in practice changes, and the most effective methodologic approaches to emergency diagnostic imaging research
3. Explore and improve knowledge of specific funding mechanisms available to perform research in emergency diagnostic imaging

Accepted manuscripts will present original, high-quality research in emergency diagnostic imaging in areas such as clinical decision rules, shared decision making, knowledge translation, comparative effectiveness research, and multidisciplinary collaboration. They may include work in clinical/translational, health systems, policy, or basic sciences research. Papers will be considered for publication in the December 2015 issue of *AEM* if received by April 17, 2015. All submissions will undergo peer review and publication cannot be guaranteed.

For queries, please contact Jennifer R. Marin, MD, MSc (jennifer.marin@chp.edu) or Angela M. Mills, MD (millsa@uphs.upenn.edu) the 2015 consensus conference co-chairs. Information and updates will be regularly posted in *AEM*, the SAEM Newsletter, and the journal and SAEM websites.


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The Post-Doctoral Fellow will carry out injury research in close collaboration with mentors and colleagues in the Department of Emergency Medicine, Program in Public Health, and School of Social Ecology. The fellow will analyze data from current research projects and existing traffic injury data sets, develop skills as an independent researcher, and develop new projects.

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Required doctoral degree in epidemiology, public health, or safety research, with a focus on injury, alcohol, or mental health research.

Other considerations:

1. Strong analytic skills and outstanding individual initiative.
2. Strong skills in data management and analysis, including experience using standard statistical packages.
3. Excellent scientific writing and spoken English skills.
4. Preference is given to applicants whose training and research interests align with the CTIPR.

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Shahram Lotfipour, MD MPH (SHL@uci.edu, 714-456-2326) and Bharath Chakravarthy MD MPH (bchakrav@uci.edu, 714-456-6986).

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Topics (Tentative)
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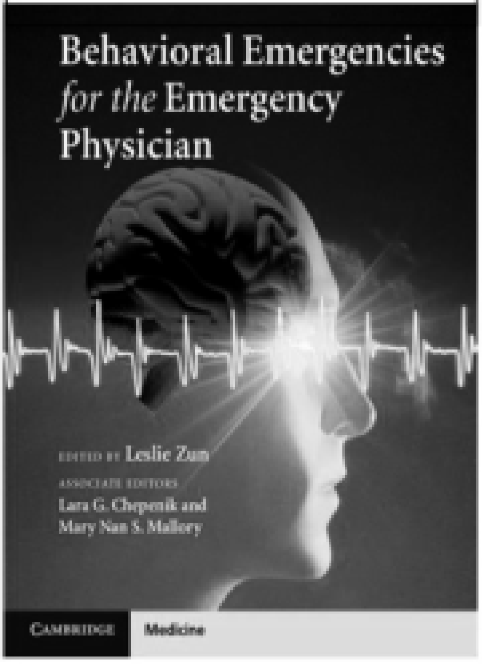

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