

Online Access by Adolescents in Accra: Ghanaian Teens' Use of the Internet for Health Information

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In developed countries, adolescents go online to find information about health; however, little is known about the online practices of youth from developing countries. This study's purpose was to explore and provide current information, drawn from adolescents living in Ghana's capital city of Accra, on the use of the Internet as a health information source. Using a representative sample of in-school adolescents and a convenience sample of out-of-school adolescents, 778 15- to 18-year-olds completed a detailed media and health information survey. Two-thirds (66%) of the in-school youth and approximately half (54%) of the out-of-school youth had previously gone online. Of all these Internet users, 53% had sought online health information, and this percentage did not differ significantly by gender, age, ethnicity, or even school status. Youth reported great interest, high levels of efficacy, and positive perceptions of online health information. Although more research should be conducted, this study offers exciting data on the potential to deliver, via the Internet, health information to youth in developing countries.

Keywords: Ghana, adolescents, Internet, health, computers

Adolescents from both developed and developing countries face similar challenges as they transition from childhood to adulthood. Emotional, cognitive, and social factors help to define adolescence; however, sexual maturation is the most distinctive (and often problematic) feature of this developmental stage (Katchadourian, 1990). The concept of adolescent health is more than "not being sick"; for youth "being healthy includes living up to one's potential; being able to function physically, mentally, and socially; and experiencing positive emotional states" (Millstein & Litt, 1990). Given their level of need and the number of unanswered questions regarding healthy behaviors, adolescents underutilize current health care systems. This is a function of several factors including cost, scheduling, and concerns about confidentiality (Millstein & Litt, 1990).

In that this research occurred in Ghana, a developing country in West Africa (see Figure 1 for a map of Ghana), let us present some information on the health of adolescents from this country. To begin, Ghana has a young population. The proportion of adolescents far exceeds that of any other age group and forms nearly 50% of the entire population (Ghana Statistical Service, 2000). According to Ghana's Ministry of Health, the most common diseases the

younger population are as follows: 5–14 years—worm infestation, bilharzias, dental caries, gingivitis, tooth decay, accidents, traumas, injuries, visual and auditory problems, and yaws; and 15–49 years—tuberculosis, hypertension and strokes, cancers (lymphoma, cancer of the cervix, and hepatoma), neuropsychiatry (alcohol and substance abuse), communicable diseases such as guineaworm, onchocerciasis, leprosy and filariasis, and workplace injuries. Other health problems that affect adolescents in Ghana include nutritional disorders, mental health issues, substance abuse, and malaria (Ministry of Health, 1999, 2000).

In Ghana (as in other countries), economic, social, and cultural pressures promote unsafe sexual practices among adolescents, especially those living in the poorest communities (Anarfi, 1995, 2000; Anarfi & Antwi, 1995). In Ghana, the median ages at menarche and first sex are 13.8 and 17.5 years, respectively (Ghana Statistical Service, 1998). According to the 1998 Ghana Demographic and Health Survey, the reported age of first marriage was 19.3 years and that 38% of girls and 19% of boys 15–19 years of age were already sexually active. Births to girls younger than 20 years of age constitute 32% of all births and often result in high health risks, including hypertension, premature deliveries, low birth weight, and retarded fetal growth. These risks contribute to rising infant mortality in Ghana. The numbers of induced and spontaneous abortions are strikingly high among adolescents 15–19 years of age and constituted 39% of all abortions in 1998. Knowledge levels of sexually transmitted infections are reportedly low among Ghanaian adolescents, as is the use of contraceptives among 15- to 19-year-olds. This population of sexually active adolescents is at very high risk of contracting one or more sexually transmitted infections, including HIV/AIDS (Ghana Statistical Service, 2000, 2003). The HIV prevalence rate among the adult population (ages 15–49) is 3.1%, which is lower than the rate in the neighboring countries of Burkina Faso (4.2%) and Cote d'Ivoire (7.0%) (UNAIDS, 2004). A fertility survey of approxi-

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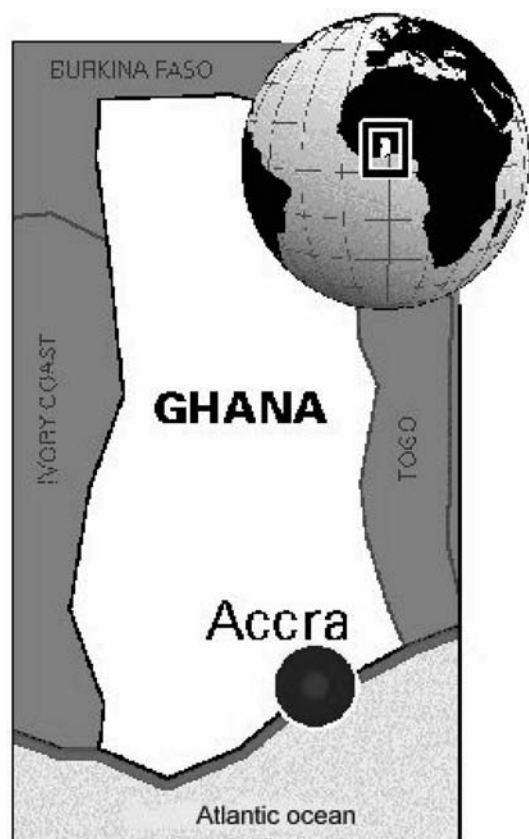


Figure 1. Map of Ghana and the capital city of Accra.

mately 1800 adolescents in and around the capital city of Accra showed that 67% and 78% of male and female adolescents, respectively, were sexually experienced. The study revealed that although there were high levels of awareness about contraception, many adolescents still engaged in unprotected sex (Agyei, Biritwum, Ashitey, & Hill, 2000).

To enhance the health of populations, especially young populations, many people are optimistic about the Internet. Some assert that a primary role of the Internet is to deliver information and improve the health of populations, especially in developing countries (Edejer, 2000; Odutola, 2003). Access to information and communication services is now seen as a universal right, and the United Nations is advocating for a global initiative for such access within this decade (United Nations Development Programme, 2000). Although concern is raised about the quality of online health information (Arunachalam, 1998), the nature of this technology, including the ease of access and the anonymous and nonpunitive quality of use of the Internet, makes it a particular attractive information source, especially for sensitive health issues (Borzekowski & Rickert, 2001a; Gould, Munfakh, Lubell, Kleinman & Parker, 2002; Odutola, 2003; Suzuki & Calzo, 2004).

Young people are more likely to go online than their older counterparts. Those in their teens and twenties are more adept at using newer technology, and because of the nature of technology, youth are "more inclined to interact with it, to be responsive to it, and open to change" (Edejer, 2000, p. 799). Although most ado-

lescents use the Internet to facilitate social interactions (e-mailing, chatting, and instant messaging) (Gross, 2004), many access the Internet to find information on a range of health topics (Borzekowski & Rickert, 2001a,b; Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005; Rideout, 2001). Youth with special health needs, including those with chronic illnesses and disabilities, often access and benefit from interacting with online communities (Battles & Wiener, 2002).

Ghana is rapidly developing as an information technology hub in West Africa. According to 2002 statistics, Ghana had approximately 170,000 Internet users compared with its neighbors Burkina Faso and Cote d'Ivoire, which had 25,000 and 90,000 users, respectively (United Nations Statistics Division, 2005). In Ghana, this represents .78 per 100 population and in Burkina Faso .39, and in Cote d'Ivoire .55. Full commercial access was available as of January 1995, and it is estimated that in Accra there are over 150 cybercafés, where usage costs around US \$0.02 per minute (Ahiabenu, 2004).

The purpose of this study was to explore and provide current information on the use of the Internet as a health information source by adolescents living in Ghana's capital city of Accra. As no one has yet collected and published these data, we are not testing any specific hypotheses; rather, this is a descriptive study of current Internet use among Ghanaian adolescents. First, we present the personal and media use characteristics of our sample, and then we offer data on their general health information sources. Next, we discuss whether the adolescents use the Internet for health information, for school, for work, or for personal purposes, and we consider which characteristics relate to using the Internet as a health information source. We also indicate which health topics adolescents have sought out online. For all surveyed adolescents, we describe levels of interest and self-efficacy in finding online health information about a range of sexual health issues. Lastly, we present information on the adolescents' perceptions of the Internet, investigating common attributes of online health information.

As with most of our research work investigating Internet use, our research team employed the theoretical framework of Uses and Gratification to help guide the purpose, protocols, and analyses of this study. Among communication theories, Uses and Gratification is unique in that it assumes that the audience member is in control, active, and goal-directed, as opposed to simply receiving media messages. Unlike a passive recipient, the individual takes the initiative (consciously or subconsciously) to link gratification needs with his or her media choice and use, from among alternative media and other available sources (Blumler & Katz, 1974; Papacharissi & Rubin, 2000). Besides having a high degree of interactivity, the Internet offers an anonymous, nonpunitive, and easily accessible space to find sensitive information (Borzekowski & Rickert, 2001a; Suzuki & Calzo, 2004). Uses and Gratification theory is extremely relevant to the study of adolescents' use of the Internet for health information as it offers a framework for investigating why youth would turn to this particular medium to obtain this type of information.

Methods

This study involved self-report surveys completed by adolescents, 15–18 years old, who were either in school or out of school. To conduct this study, we obtained approval from several institutions and individuals, including

the Johns Hopkins Bloomberg School of Public Health Committee on Human Research, the Director-General of Ghana's Educational Service, Accra's Regional Director and Metropolitan Director of Education, the Accra Sub Metropolitan District Education Officers, the headmasters or headmistresses of the selected schools, and the directors of community centers.

Sampling and Procedures

We used a multicluster, multistage random selection approach to obtain a generalizable sample of adolescents from Accra, the capital of Ghana. For the in-school sample, two schools from each of the six submetro districts were randomly selected, based upon draws from all-inclusive lists of secondary schools in each of Accra's submetro districts. We selected a total of 12 schools, two from each of the submetro districts, so that we had a contingency if the initial school refused to participate. All initially selected schools agreed to be involved, for a total of six schools. At each school, we obtained rosters of attending students and randomly selected 100 adolescents to participate. We received very strong support from school authorities and, probably because of the students' undeniable obedience and desire to please their teachers and headmasters or headmistresses, none of the selected students refused to complete our survey.

In September and October 2004, our research assistants gathered students into group-assessment sessions, some during and others after the school day. Adolescents responded to 72 closed-ended questions, and this one-time-only 18-page anonymous survey took approximately 45 minutes to complete.

For the out-of-school sample, we approached community centers that are known to work with such youth. We held orientations with center administrators and staff, describing the methodology and purpose of the study. We gave surveys to these administrators and staff, and they approached and recruited out-of-school youth to participate during a 2-week period in November 2004. Only participant consent was used with the out-of-school youth, and administrators were permitted to read the survey aloud if the participant's literacy skills did not meet that of the questions (the survey booklet was designed at a seventh grade reading level.)

Measures

Faculty and research assistants at the University of Ghana reviewed a self-report media and health information survey, developed from earlier research done with U.S. adolescents (Borzekowski & Rickert, 2001a, 2001b). Questions and response choices were slightly modified so that the Ghanaian survey was more culturally appropriate than if the U.S. version had been used. For example, when asking about ethnicity, the modified survey included response choices such as Asante, Fante, Ga/Adangbe, and Ewe. To gauge socioeconomic status, the Ghanaian survey asked whether the household had items such as a telephone or a refrigerator, whereas the U.S. survey asked about parents' highest level of education.

The final instrument began with a demographic section and then included a brief assessment of the adolescent's general health behaviors, knowledge, and attitudes. The next section examined media ownership, use, and knowledge, including accessing online health information. The final survey section asked adolescents about their perceptions of the Internet. In general, we used multiple-choice questions, for which participants could easily indicate their responses. For example, when asking about the topics adolescents had tried to get information on from the Internet, we provided a list of 20 topics from which participants could check off as many as applied. In several instances, we used visual analog scales so that adolescents could mark off on a scale their subjective responses. For example, to assess interest and perceived self-efficacy, we used visual analog scales, for which the extremes were marked *not interested at all* to *extremely interested* or *not confident at all* to *extremely confident*. With this approach, youth could easily indicate their interest and perceived self-efficacy in finding online health information on different sexual health topics. Youth were instructed to indicate with an "X" their responses and the placement of this "X" was then measured and converted into a number from 0 to 10.

Results

For this study, 778 adolescents participated. Sample characteristics are offered in Table 1, and media ownership and use appear

Table 1
Sample Characteristics

Characteristics	Total (N = 778)	In-school (n = 600)	Out-of-school (n = 178)	χ^2 statistic
Gender (% male)	39	33	58	34.9***
Age (%)				
15	13	14	11	39.6***
16	32	35	22	
17	28	30	22	
18	27	21	45	
Ethnic group (%)				
Asante	14	14	14	12.9*
Akwapim	8	8	7	
Ewe	18	17	22	
Fante	18	17	20	
Ga/Adangbe	29	32	21	
Hausa	4	3	6	
Other	9	10	9	
Household appliances and vehicle ownership (% yes)				
Refrigerator	79	86	69	24.5***
Radio	92	96	88	13.3**
Television	89	93	83	16.3***
Telephone	58	62	45	14.3***
Car	64	69	46	28.3***

* $p < .05$. ** $p < .01$. *** $p < .001$.

in Table 2. Because we observed significant differences for practically all the personal and media variables between those adolescents who were in school and out of school, we present results separately for these two groups.

In-School Adolescents

As shown in Table 2, two thirds (66%) of the in-school adolescents self-reported that they had used the Internet and about one quarter (24%) indicated that they had home access to the Internet. Of those who said that they had ever used the Internet, 6.1% reported that they were online 0 days a month, whereas 38.5% said they used the Internet 1–3 days a month, and 55.3% said they used the Internet 1 or more days a week. Use frequency was not associated with gender, age, or ethnicity. Not surprisingly, those with home access indicated more frequent Internet use; 64.6% of those with home access compared with 50.4% of those without home access said they used the Internet 1 or more days a week, $\chi^2(2, N = 349) = 7.8, p < .05$. Among the 145 in-school youth reporting home access, 59.3% said that access was established through a phone line, 13.8% through a cable modem, and 11% through DSL.

The most popular access location for in-school Internet users was the Internet cafe; some 85.0% indicated that they had gone online at an Internet cafe. The next most popular access locations were school (35.0%), home (24.1%), friend's house (19.8%), or another family member's house (13.5%). No significant differences appeared for access locales for in-school youth of different genders, ages, or ethnicities.

When asked to indicate as many activities as applied, 77.9% of in-school Internet users reported that they had e-mailed other people. Other popular Internet activities were getting information about or playing music (57.6%) or games (47.0%), learning about TV or movies (44.9%), and getting local, national, or international news (37.8%). Less popular, but still prevalent for these youth, was visiting chat rooms and checking online boards (29.2%) and instant messaging with friends (22.8%). The only activity that

significantly differed by gender was use of chat rooms or checking online boards; 37.7% of male Internet users compared with 24.3% of female Internet users did this activity, $\chi^2(1, N = 393) = 7.9, p < .01$. Similar percentages of youth from the different ethnic groups engaged in most of the online activities, although differences appeared for using the Internet for playing games, $\chi^2(6, N = 379) = 15.4, p < .05$, or getting information about TV or movies, $\chi^2(6, N = 379) = 17.6, p < .01$. Higher percentages of Asante and Ewe youth engaged in both these activities compared with their peers of other ethnic groups. As well, younger Internet users were more likely than their older peers to use the Internet to get information about TV or movies, $\chi^2(3, N = 391) = 13.7, p < .01$; for the rest of the online activities, no other significant differences were observed in relation to the youth's age.

In the survey youth were questioned about common sources they turn to for sexual health information (see Table 3). Parents, health providers, and books (in that order) were the most popular choices, although girls were more likely than boys to indicate that they turned to each of these. The Internet was selected by one third of this sample as a sexual health information source, more popular than friends, magazines, or clergy as a source. Naturally, those who reported that they used the Internet were more likely that those who had not used the Internet to select this as a health information source, $\chi^2(1, N = 565) = 17.4, p < .001$.

When asked specifically whether they had tried to get health information from the Internet, 37.3% of in-school Internet users indicated that they had tried to get information for school or work, and 45.9% said they had tried to get health information for more personal purposes. Combined, 35.0% of the total sample of in-school youth and 53.3% of in-school Internet users had tried to get some type of health information. The percentage of Internet users who had tried to get health information did not differ significantly by gender, age, or ethnicity. When asked why they went to the Internet for health information, the most common responses chosen were that the Internet offers a range of opinions, is easily available, and provides relevant information.

Table 2
Media Use Among Sample

	Total (<i>N</i> = 778)	In-school (<i>n</i> = 600)	Out-of-school (<i>n</i> = 178)	χ^2 or <i>t</i> test statistic
Working radios in household (%)				
0	8	5	15	32.8***
1	22	19	30	
2 or more	70	76	55	
Hours/week listening to radio [<i>M</i> (<i>SD</i>)]	16.1 (18.0)	14.5 (16.9)	21.3 (19.8)	4.1***
Working televisions in household (%)				
0	14	11	24	23.5***
1	34	34	34	
2 or more	53	56	42	
Hours/week watching television [<i>M</i> (<i>SD</i>)]	17.3 (17.9)	16.7 (17.3)	19.4 (20.0)	<i>ns</i>
Ever used the Internet (% yes)	63	66	54	8.1**
Home access to the Internet (% yes)	21	24	8	20.8***
E-mail account (% yes)	42	41	49	3.9*

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Sexual Health Information Sources for Adolescents From Accra

Sources (%)	Total (<i>N</i> = 778)	In-school (<i>n</i> = 600)	Out-of-school (<i>n</i> = 178)	χ^2 statistic: in-school vs. out-of-school youth
Health provider/clinic	59.6	58.0	68.9	6.4*
Parents	56.5	62.1	41.2	23.0***
Books	51.4	54.8	44.6	5.2*
Public health campaigns	46.4	45.7	49.2	<i>ns</i>
Health class	42.0	44.6	35.6	3.9*
Teachers	40.9	47.7	20.9	40.4***
Television	39.0	43.9	24.3	20.7***
Internet	34.3	33.3	39.0	<i>ns</i>
Friends	33.4	34.3	32.8	<i>ns</i>
Magazines	28.5	29.6	27.7	<i>ns</i>
Clergy/religious leader	26.3	27.3	24.9	<i>ns</i>
Grandparents/other relatives	21.6	25.4	8.5	23.6***
Siblings or cousins	18.3	21.4	7.9	16.7***
Boyfriend or girlfriend	11.1	12.1	8.5	<i>ns</i>

* $p < .05$. *** $p < .001$.

From a list of 21 choices of health topics (alcohol use, cancer, contraception, dating violence or rape, diet/nutrition, drug use, fitness or exercise, heart disease, illness support groups, medicines/pharmaceuticals, mental health issues, parenting, physical abuse, pregnancy, puberty/development, sexual abuse, sexual activities, sexually transmitted diseases (including HIV/AIDS), smoking cigarettes, violence, and other), participating youth were asked to select as many health topics as they had ever tried to get online information on. The most common choices, regardless of whether the information was wanted for school, work, or personal use, are presented in Table 4. Among in-school youth, sexually transmitted diseases, diet/nutrition, and fitness or exercise were the most popular choices (in that order).

Out-of-School Adolescents

Among out-of-school youth, 53.9% self-reported that they had used the Internet and 8.4% had home access to the Internet (see Table 2). Of the 15 out-of-school youth with home Internet access, 4 reported that they had access through a phone line, 1 had a DSL

connection, and 10 either did not know or did not respond to the question. For those with previous Internet experience, 43.8% reported they went online 1–3 days a month and 52.1% 1 or more days a week; the others said they used the Internet 0 days per month (1%) or did not respond to this question (3.1%). For out-of-school youth, use frequency was not associated with gender, age, or ethnicity.

Practically all (92.7%) of the out-of-school youth Internet users indicated that they had gone online at an Internet café. The next most popular access locales included a friend's house (27.1%), a school setting (25.0%), another family member's house (17.7%), or one's own home (11.5%). No significant differences appeared for access locales for those of different genders, ages, and ethnicities.

Among out-of-school Internet users, the most popular Internet activities concerned communicating with others. Some 92.7% of Internet users reported that they had e-mailed with other people, 50.0% had done instant messaging with friends, and 43.8% had gone to online chat rooms or checked online boards. Around

Table 4
Among Those Who Have Used the Internet, the Percentage of In-school and Out-of-School Youth Who Reported That They Had Accessed These Health Topics Online

Health topics	Total sample of Internet users (<i>N</i> = 492)	In-school Internet users (<i>n</i> = 396)	Out-of-school Internet users (<i>n</i> = 96)	χ^2 statistic
Sexually transmitted diseases (including HIV/AIDS)	44.7	43.8	45.3	<i>ns</i>
Diet/nutrition	36.2	39.9	23.2	9.6**
Fitness or exercise	33.3	35.9	22.1	7.0**
Sexual activities	32.7	31.8	35.8	<i>ns</i>
Drug use	30.5	31.0	27.4	<i>ns</i>
Sexual abuse	32.3	31.8	33.7	<i>ns</i>
Pregnancy	28.0	28.0	26.3	<i>ns</i>
Heart disease	20.1	19.3	22.1	<i>ns</i>

** $p < .01$.

44.8% had gone to the Internet to get information about or play music and 32.3% had played online games. Of this group, 29.2% had used the Internet to learn about TV or movies, and 25.0% had gone online to get local, national, or international news. No activities were significantly associated with gender or ethnicity; however, older out-of-school Internet users were more likely than their younger peers to go to the Internet to find information about TV and movies, $\chi^2(3, N = 94) = 8.3, p < .05$, and play music, $\chi^2(3, N = 94) = 8.1, p < .05$.

The most common sexual health information sources for out-of-school youth were health providers and clinics, followed by public health campaigns, books, and parents (in that order) (see Table 3). The Internet was selected by 39% of this sample as a sexual health information source, more popular than health classes, friends, magazines, clergy, or TV. Internet users were, of course, more likely than Internet nonusers to select this as an information source, $\chi^2 = (1, N = 178) = 17.8, p < .001$.

Approximately one third (37.5%) of the out-of-school Internet users answered that they had tried to get online health information for school or work, and 41.7% said that they had tried to get online health information for more personal purposes. Regardless of why they had tried to get the information, 38.2% of the total sample of out-of-school youth and 52.1% of out-of-school Internet users had tried to get health information. The percentage of out-of-school Internet users who had tried to get health information did not differ significantly by gender, age, or ethnicity. Like the reasons chosen by the in-school students, the out-of-school students' most common reasons for going getting health information from the Internet were that Web sites offering health information provide a range of opinions, the Internet is easily available, and it offers relevant information.

Referring to Table 4, we see that out-of-school Internet users most often selected sexually transmitted diseases as a health topic that they had researched. Like the in-school youth, out-of-school youth were interested in sexually transmitted diseases, sexual activities, and sexual abuse; however, out-of-school youth were less interested in diet/nutrition or fitness or exercise than in-school youth.

When examining the out-of-school youths' interest and perceived self-efficacy in finding online health information on different health topics, we observed no significant differences for male and female interest and self-efficacy. However, we found age and ethnicity to be associated with both. Consistently, older out-of-school youth indicated higher levels for both interest and efficacy for finding online health information (all interest and all efficacy variables were $p < .05$). For example, 15-year-olds had a mean interest score of 1.8 for finding online information about contraceptives, whereas the 18-year-olds had a mean score of 5.0, $F(3, 172) = 5.4, p < .001$. Some differences were found across out-of-school youth of various ethnic groups. Interest in finding online information about pregnancy, $F(6, 168) = 4.4, p < .001$, and parenting, $F(6, 168) = 2.9, p < .01$, varied by ethnic groups, with Hausa youth having the highest scores and Akwapim youth having the lowest scores. One's confidence in finding online information about physical changes, $F(6, 168) = 3.2, p < .01$, contraceptives, $F(6, 168) = 2.4, p < .05$, sexually transmitted diseases $F(6, 168) = 2.5, p < .05$, and pregnancy $F(6, 168) = 3.1, p < .01$, differed by ethnic group. Again, Hausa youth had the highest scores, and Akwapim youth had the lowest scores. The out-of-

school Internet users, compared with those who had not used the Internet, had higher interest and efficacy for finding online health information for all health topics (all $p < .05$).

Out-of-school youth reported favorable perceptions for using the Internet to find health information. No significant differences in perceptions were found for gender; however, age was associated with different perceptions for all the variables (all $p < .05$), except for whether or not the source is evident. Older youth had more favorable perceptions than younger youth. Only for the perception that it is possible to find relevant online health information did we observe differences for ethnicity $F(6, 168) = 2.6, p < .05$. Again, it was Hausa youth who had the most positive perceptions ($M = 7.2$), and Akwapim youth who had the least positive perceptions ($M = 3.0$). For all the perception variables, we found that out-of-school Internet users, compared with those youth who had not used the Internet, had significantly higher scores (all $p < .01$). For example, non-Internet users had a mean score of 2.7, compared with Internet users who had a mean score of 6.5, for whether it was possible to find useful online health information, $t(147) = 5.9, p < .001$.

Group Differences

The biggest difference between in-school and out-of-school youth is the significantly smaller role of parents as sexual health information sources for out-of-school youth (see Table 3). In addition, the Internet has greater relative importance for out-of-school youth, ranking fifth in comparison with eighth for in-school youth (see Table 3).

Using multivariate modeling (see Table 5), we find that gender, age, and school status significantly predict levels of interest in finding health information across different topics. Female adolescents, older adolescents and in-school youth show greater interest.

Using the same type of modeling, we found that school status was the only consistent variable to significantly predict perceived efficacy in finding information about physical changes, sexually transmitted infections, gay and lesbian issues, and pregnancy. In-school youth saw themselves as more capable with the Internet. Comparing those who had used the Internet with those who had not, we observed no significant differences in interest levels for finding information on the various health topics. In contrast, previous Internet use was associated with higher confidence in finding online health information for all the listed topics (all $p < .001$), except for information on physical changes during adolescence.

Also using a visual analog scale, for which the extremes reflect the specific question being posed, we asked youth to mark their opinions anywhere on the scale to show their perceptions about online health information. We present the results in Table 6. In-school youth had significantly higher perceptions than out-of-school youth for several of the variables. When we created multivariate models predicting these perceptions and we controlled for gender, age, and school status, the only significant predictor was school status. Among in-school youth, Internet users offered more favorable opinions about online health information than non-Internet users for all seven perception variables ($p < .001$).

Discussion

This study offers exciting information about the reach and positive use of the Internet. Adolescents from Ghana's capital city

Table 5
Regression Analyses Predicting Interest in Finding Online Health Information Among Youth, Regardless of Whether or Not They Had Used the Internet (N = 769)

Topics	Gender (0, female; 1, male)			Age (15, 16, 17, 18)			School status (0, out-of-school; 1, in-school)		
	β	SE	p	β	SE	p	β	SE	p
Physical changes	-0.71	0.28	.01	0.37	0.13	.01	1.17	0.33	.001
Contraceptives	-0.58	0.29	.05	0.44	0.14	.001	0.18	0.34	ns
Sexually transmitted diseases	-0.60	0.29	.04	0.18	0.14	ns	1.07	0.33	.001
Gay, lesbian, or bisexual issues	.43	0.29	ns	0.25	0.14	.07	1.11	0.34	.001
Pregnancy	-1.05	0.29	.001	0.22	0.14	ns	0.70	0.34	.04
Parenting	-0.57	0.29	.05	0.41	0.14	.004	0.093	0.34	.006

Note. Dependent variables are the interest levels in the different health topics.

of Accra are accessing the Internet, and a large percentage, regardless of their school status, gender, age, and ethnicity turn to the Internet for health information. In the United States, previous research showed that among 15- to 24-year-olds, some 75% of youth who had gone online had tried to get health information either for personal or school use (Rideout, 2001). Whereas fewer Ghanaian youth had ever gone online (63% of this sample compared with more than 90% of the U.S. youth) (Rideout, 2001), slightly more than half (53%) of these who had used the Internet had sought online health information.

Despite the fact that out-of-school adolescents had much less access to the Internet, the Internet was a relatively more important source of information for sexual health information for out-of-school than for in-school youth. For out-of-school adolescents, the Internet ranked fifth in importance as a source, whereas for in-school adolescents, it ranked ninth (see Table 3). At the same time, parents were a significantly greater source of sexual health information for in-school adolescents (also seen in Table 3). This pattern of differences may reflect a situation in which, given the popularity of inexpensive Internet cafes, the Internet is relatively more accessible than many other sources for out-of-school youth, who are lower on the demographic ladder than in-school youth (see Table 2). At the same time, out-of-school youth may have parents with less formal education than the in-school youth; this may mean that these parents have more traditional attitudes that inhibit discussion of sex. Therefore, the parents of out-of-school

youth may be less available to discuss sexual issues with their children. In a globalized world in which HIV/AIDS is rampant in Africa, this finding has tremendous public health implications. The Internet may become an increasingly effective way to reach lower socioeconomic status youth with prevention messages.

Indeed, although in-school and out-of-school youth differed in their demographic and media use patterns, we observed similar patterns among these two separate samples. Adolescents from these distinct groups used the Internet for health information. Female and older adolescents from both groups had higher levels of interest in accessing different health topics. A few other differences between the in-school and out-of-school youth are also worth noting. In-school adolescents were more likely than out-of-school youth to have accessed information about diet and physical activity. In-school youth may have more Western ideas (perhaps because of greater exposure to media messages). These ideas might result in higher levels of interest in their physical appearance and greater understanding of the importance of intentional physical activity to offset weight gain associated with more sedentary lifestyles (Popkin, 2003).

High levels of interest and confidence in finding online health information were observed not only among Internet users but also among those who had not yet used the Internet. These youth from Accra perceived online health information to have many positive characteristics, suggesting that this resource was useful, easy to read, and trustworthy. Practitioners should note that even among

Table 6
Perceptions About Health Information Found on the Internet

	Total (N = 778)		In-school youth (n = 600)		Out-of-school youth (n = 178)		Student's <i>t</i> test statistic
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Useful	5.9	(3.9)	6.2	(3.7)	5.2	(4.2)	2.4*
Easy to read	5.9	(3.9)	6.1	(3.8)	5.2	(4.1)	2.5*
Trustworthy	5.8	(3.8)	5.8	(3.6)	5.1	(4.0)	ns
Relevant	5.7	(3.9)	5.9	(3.8)	5.2	(4.2)	ns
Accurate	5.4	(3.9)	5.5	(3.9)	5.3	(4.1)	ns
Visually appealing	5.1	(4.0)	5.4	(3.9)	4.2	(4.1)	2.5*
Source is evident	4.6	(4.8)	4.6	(3.9)	4.0	(4.0)	ns

* $p < .05$.

those who do not currently use the Internet, youth hold positive attitudes about the Internet as a health resource, suggesting that this medium may be used by all Ghanaian youth in coming years as this technology continues to spread. In the meantime, it seems logical to develop prohealth Web sites as there are high levels of access, interest, confidence, and favorable perceptions among different groups of youth. Future researchers, also using a Uses and Gratification approach, should delve further into why specific uses fulfill certain needs and which needs remain ungratified.

Across the globe, young people try to obtain information about health, especially sexual health (Borzekowski & Rickert, 2001b; Suzuki & Calzo, 2004); however, physical, cultural, and financial barriers often prevent youth from obtaining appropriate and credible information (Rosen, Elster, Hedberg, & Paperney, 1997). Nothing will or should replace interactions with health providers, but easily accessible, understandable, credible, and confidential information can improve the lives and choices of young people. The Internet is an invaluable tool for adolescents who use it to look for answers to personal, sensitive, and embarrassing questions about their bodies, relationships, and health (Suzuki & Calzo, 2004).

It is critical to understand that at this specific life stage, many youth may feel more comfortable turning to the Internet than to more traditional health information sources. What is also unknown is the impact of online health information seeking. There is some evidence from the United States that a moderate percentage of youth who looked up online health information followed up with visits to their health care practitioners. We do not know from this research whether Ghanaian adolescents are turning only to the Internet or whether they are using this medium in combination with other resources such as their parents, teachers, or health practitioners. We are aware, however, that in this period of life, adolescents are seeking sources other than their parents and guardians to establish their own sense of identity. It would be valuable to examine through future research whether seekers of online health information in this particular developmental stage are having their needs gratified through this use. In this study, the popular reasons offered for why adolescents turned to the Internet for health information included the different opinions presented on the Internet, the relevant information, and the ease use of this resource.

To create effective health interventions directed to adolescents, in both developed and developing countries, designers ought to consider how adolescents use and appreciate the Internet as a health information source. In less developed countries, offering youth evidence-based information can even impact the effective development and implementation of family planning and HIV/AIDS interventions (Mayer, Pillsbury, & Mukenge, in press).

A strength of this study is the care given to developing and using appropriate protocols. Because we randomly sampled in-school students from the different submetro districts, we believe that this study is presenting generalizable information on in-school adolescents from Accra. The use of community centers to recruit out-of-school youth probably means that we have sampled the demographic high end of out-of-school youth, as these youth have ties to a community organization. Our measures derive from previously developed instruments that have been used with adolescent samples from the United States (Borzekowski & Rickert, 2001b; Rideout, 2001). In particular, we are finding that the visual analog scales work extremely well with this age group in allowing ado-

lescents to indicate subjective answers. A weakness of this work, from which other health and media surveys also suffer, is that we have relied on self-report measures. Possibly, adolescents may overestimate their use of the Internet, suggesting that they use this medium for accessing health information when, in fact, they do not. A more naturalistic study in which adolescents' behaviors are observed over a given time period could provide more valid data, although the practicality of doing such work is not realistic. A more realistic method might be the use of daily diaries (Gross, 2004).

Earlier studies show that adolescents from developed countries, such as the United States, Canada, and the United Kingdom, access and use the Internet as a health information source (Borzekowski & Rickert, 2001b; Gray et al., 2005; Skinner, Biscope, Poland, & Goldberg, 2003). This article is the first we are aware of that describes how adolescents from a developing country turn to the Internet to learn more about various health topics. Additional work should be done to examine whether adolescents in other developing countries are also using the Internet as a health information source. Also, follow-up studies in which researchers try to better understand not just if, but how, adolescents navigate the Internet for online health information should be conducted. Our own research team is exploring U.S. and Ghanaian adolescents' navigation patterns and critical viewing skills for online sexual health information. Other researchers should promote similar work in other countries with a range of health topics. Information from such studies could not only greatly contribute to developing better health Web sites for youth but it could also offer valuable information on creating and improving health interventions delivered through or using new media.

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