

Health Effects of Media on Children and Adolescents

abstract

Youth spend an average of >7 hours/day using media, and the vast majority of them have access to a bedroom television, computer, the Internet, a video-game console, and a cell phone. In this article we review the most recent research on the effects of media on the health and well-being of children and adolescents. Studies have shown that media can provide information about safe health practices and can foster social connectedness. However, recent evidence raises concerns about media's effects on aggression, sexual behavior, substance use, disordered eating, and academic difficulties. We provide recommendations for parents, practitioners, the media, and policy makers, among others, for ways to increase the benefits and reduce the harm that media can have for the developing child and for adolescents. *Pediatrics* 2010;125:756–767

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KEY WORDS

television, media, media impact, Internet, video games

ABBREVIATIONS

ADD—attention-deficit disorder

AAP—American Academy of Pediatrics

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True, media violence is not likely to turn an otherwise fine child into a violent criminal. But, just as every cigarette one smokes increases a little bit the likelihood of a lung tumor someday, every violent show one watches increases just a little bit the likelihood of behaving more aggressively in some situation.

—Psychologists Brad Bushman and L. Rowell Huesmann¹ (p248)

One erect penis on a U.S. screen is more incendiary than a thousand guns.

—Newsweek critic David Ansen² (p66)

A cigarette in the hands of a Hollywood star onscreen is a gun aimed at a 12- or 14-year-old.

—Screenwriter Joe Eszterhas³

Research shows that virtually all women are ashamed of their bodies. It used to be adult women, teenage girls, who were ashamed, but now you see the shame down to very young girls—10, 11 years old. Society's standard of beauty is an image that is literally just short of starvation for most women.

—Best-selling author Mary Pipher⁴

More than 50 years of media research attests to the significant influence of media on child and adolescent health.⁵ Both “old” media (television, movies, magazines) and “new” media (the Internet and social networking sites, video/computer games, cell phones) can

have an impact on virtually every health concern that practitioners and parents have about young people, including aggressive behavior, risky sexual behavior, substance use, and disordered eating.⁶ Although the media are not the leading cause of any of these problems, the research reviewed here suggests that they are significant. Yet, despite the evidence of potential harm, there is also evidence that media can be beneficial for youth (eg, by increasing empathy and acceptance of diversity through modeling of prosocial behaviors⁷ and developing children's early literacy skills through educational programming⁸). Those concerned with child and adolescent health need to be aware of the research on the effects of modern media on youth.

TRADITIONAL MEDIA AND NEW MEDIA

Children and adolescents spend more time with media than they do in any other activity except for sleeping—an average of >7 hours/day (Fig 1).⁹ Chil-

dren's bedrooms are replete with media technology: by 2005, two thirds had a television set, one half had a VCR or DVD player or video-game console, and nearly one third had Internet access or a computer.⁹ Media impact is increased significantly with the presence of a bedroom television: viewing increases 1 to 2 hours/day,^{10,11} risk of overweight increases by 31%,¹⁰ and the likelihood of smoking doubles.¹² When a television is in the bedroom, parents are less able to monitor viewing habits (Fig 2), children participate in fewer activities such as reading and hobbies,⁶ and sleep is shortened.¹³

Today's youth have unprecedented access to new media and use them in expected and unexpected ways. Recent research by the Pew Internet and American Life Project revealed that 93% of youth aged 12 to 17 are on-line, and 71% have a cell phone.¹⁴ Internet users report watching videos (57%), creating and visiting social networking sites such as MySpace and Facebook (65%), making on-line purchases (38%), and getting health information

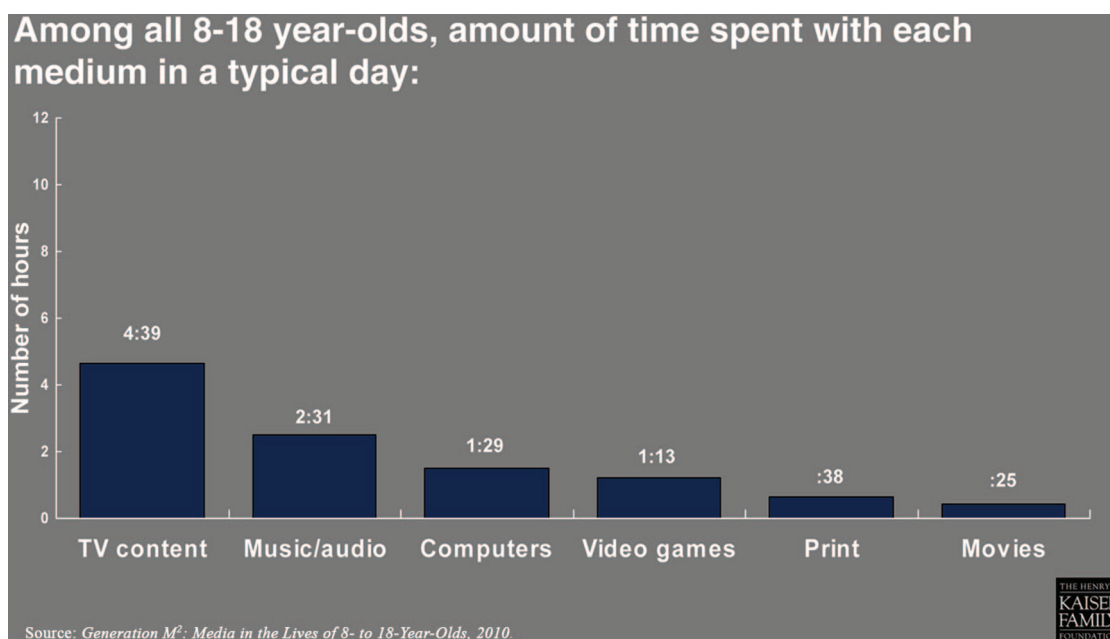


FIGURE 1

Media use according to platform. (Reproduced with permission from Kaiser Family Foundation.)

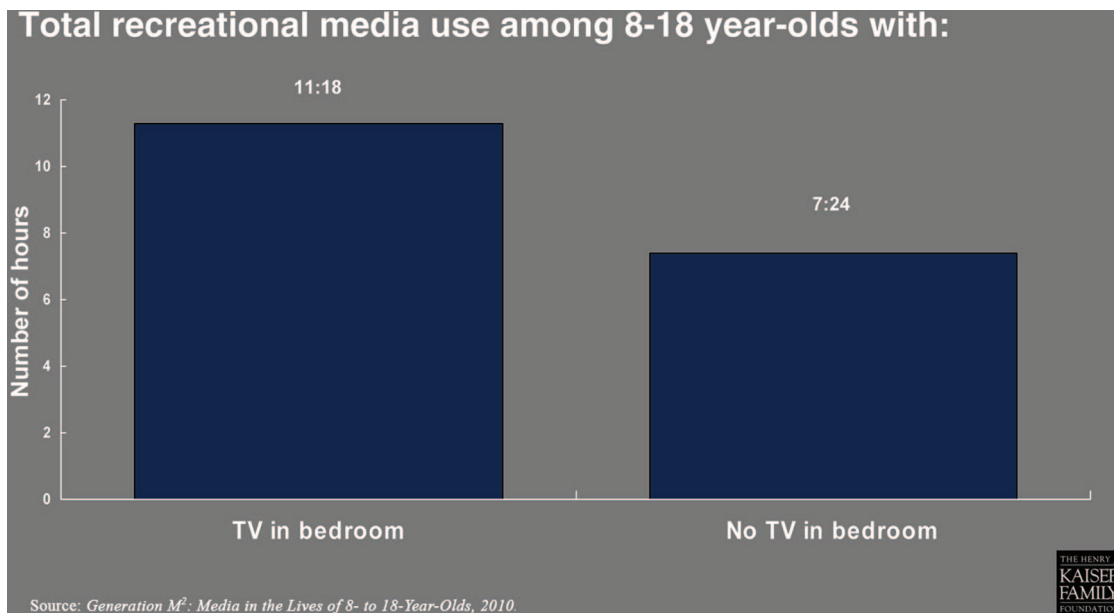


FIGURE 2 Media use according to television environment and rules. (Reproduced with permission from Kaiser Family Foundation.)

(28%).¹⁴ Youth are also avid gamers, with 97% of adolescents reporting that they play video games on the computer, Web, handheld device, or console.¹⁵ Youth are creative in their uses of new technologies, and this creativity can lead to angst for parents, teachers and health care providers. Teens can download violent videos, send sexual text messages or explicit self-photographs to their friends, buy cigarettes and beer on the Internet, and post enticing profiles on MySpace.com. Yet, across all ages, television remains the predominant medium, with television-viewing at an all-time high in the United States (Fig 3).^{9,16} At the same time, digital media have become an important source of information, and sometimes misinformation, about health problems¹⁷ and a new way of advertising to children and teenagers.^{18,19} In addition, the Internet is often used as a mechanism for bullying and harassing.^{17,20,21} Teenagers are increasingly multitasking with media,⁹ but it is unclear whether or how multitasking mitigates media effects or how cognitive processing may be affected.

Some neuroscientists worry about the impact of all of this new technology on the developing adolescent brain.²²

HOW DO MEDIA AFFECT CHILDREN AND ADOLESCENTS?

Media affect youth not only by displacing time they spend doing homework or sleeping but also by influencing beliefs and behaviors. According to social learning theory, children and adolescents learn by observing and imitating what they see on the screen, particularly when these behaviors seem realistic or are rewarded.²³ Cognitive development theory asserts that children's cognitive capacities at different stages determine if and how they understand media content. For example, children younger than 8 years who are not yet able to comprehend persuasive intent will be more vulnerable to advertising.⁶ In addition, media present youth with common "scripts" for how to behave in unfamiliar situations such as romantic relationships.²⁴ Finally, superpeer theory states that the media are like powerful best

friends in sometimes making risky behaviors seem like normative behavior.⁶ With the variety of theories suggesting a potentially powerful effect of the media and the growing empirical evidence for negative impact, one might hypothesize that parents would take care to limit exposure to detrimental media content. However, the "third-person effect" (a well-documented phenomenon in the communications literature) shows that teenagers and adults think that the media influence everyone except themselves or their children.²⁵

Violence and Aggression

By the age of 18, the average adolescent will have seen an estimated 200 000 acts of violence on television alone.²⁶ Much of the violence on television and in movies is presented in a sanitized and glamorized fashion, and in children's programming it often is presented as humorous.²⁷ More than 10% of 10- to 14-year-olds saw 40 of the most violent movies in 2003.²⁸ Both music videos and rap music have become increasingly violent.^{6,29}

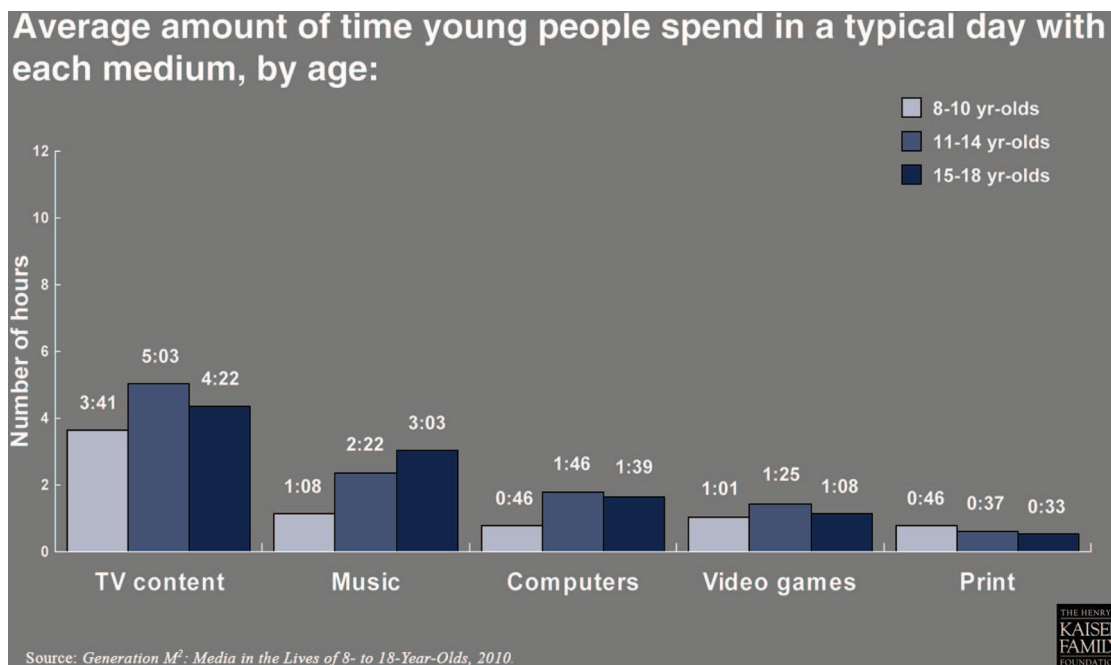


FIGURE 3 Differences in media use according to age. (Reproduced with permission from Kaiser Family Foundation.)

Interactive media can encourage antisocial beliefs and behavior in children and adolescents, particularly because violence in new media has been found to be prevalent as well. A recent analysis of video games revealed that more than half of all games contain violence, including >90% rated as appropriate for children aged 10 years and older.³⁰ Health professionals worry most about first-person shooter video games. In the aftermath of the West Paducah, KY school shooting, it was discovered that the shooter had never fired a real gun in his life before that day, yet his marksmanship was both accurate and lethal.³¹ Researchers believe that repeated exposure to mediated violence can lead to anxiety and fear,⁶ acceptance of violence as an appropriate means of solving conflict,³² and desensitization,³³ with resulting increases in aggression and decreases in altruism.³⁴ In particular, the portrayal of justifiable violence that is common in American media—"good guys versus bad guys"—places children at risk because it is so powerfully reinforcing.²³ The relationship between

media violence and real-life aggression is nearly as strong as the impact of cigarette smoking on lung cancer (Fig 4): not everyone who smokes will get lung cancer, and not everyone who views media violence will become ag-

gressive themselves. However, the connection is significant. The most problematic forms of media violence include attractive and unpunished perpetrators, no harm to victims, realism, and humor.³⁵

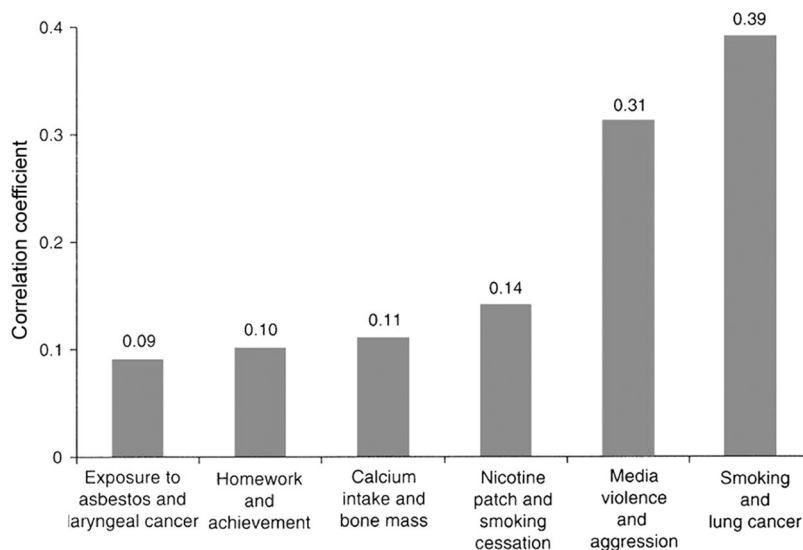


FIGURE 4 The impact of media violence on real-life aggressive behavior is stronger than many commonly accepted public health risks and nearly as strong as the link between smoking and lung cancer. (Adapted with permission from Bushman BJ, Huesmann LR. Effects of televised violence on aggression. In: DG Singer, JL Singer (Eds). *Handbook of Children and the Media*. Thousand Oaks, CA: Sage, 2001.)

Today's interactive media also give youth the opportunity to behave aggressively through Internet bullying and harassment.²⁰ The frequency with which youth report being cyberbullied has varied between studies,²¹ but it is clear that on-line bullying and harassment happens to a significant minority of youth, is sometimes distressing, is frequently correlated with other risky behaviors and psychosocial problems, and may be as strong a predictor of serious aggressive behavior as exposure to more traditional media.^{36,37}

Sex

Researchers investigating the impact of exposure to sexual content in media on adolescent sexual beliefs and early sexual initiation have found modest but significant associations, particularly in the realm of pornography. In a national sample of 1500 10- to 17-year-olds, nearly half of the Internet users had been exposed to on-line pornography in the previous year.³⁸ In a sample of middle-school youth, exposure to sexually explicit (X-rated) content predicted perpetration of sexual harassment (for males), more permissive sexual norms, having oral sex, and engaging in sexual intercourse while in high school.³⁹ Longitudinal studies now exist that have linked heavy exposure to sexual content in mainstream media with more rapid progression of sexual activity,⁴⁰ earlier coital behavior,⁴¹ greater risk for and unplanned pregnancy,⁴² and sexually transmitted disease.⁴³ One explanation for this relationship may lie in the role of the media as a "superpeer" that gives adolescent audiences a consistent message that sex is normative and risk free.⁶ In addition, media play an important role in providing sexual information to adolescents in the United States^{44,45} and in shaping their beliefs about how males and females behave in romantic relationships.³⁹

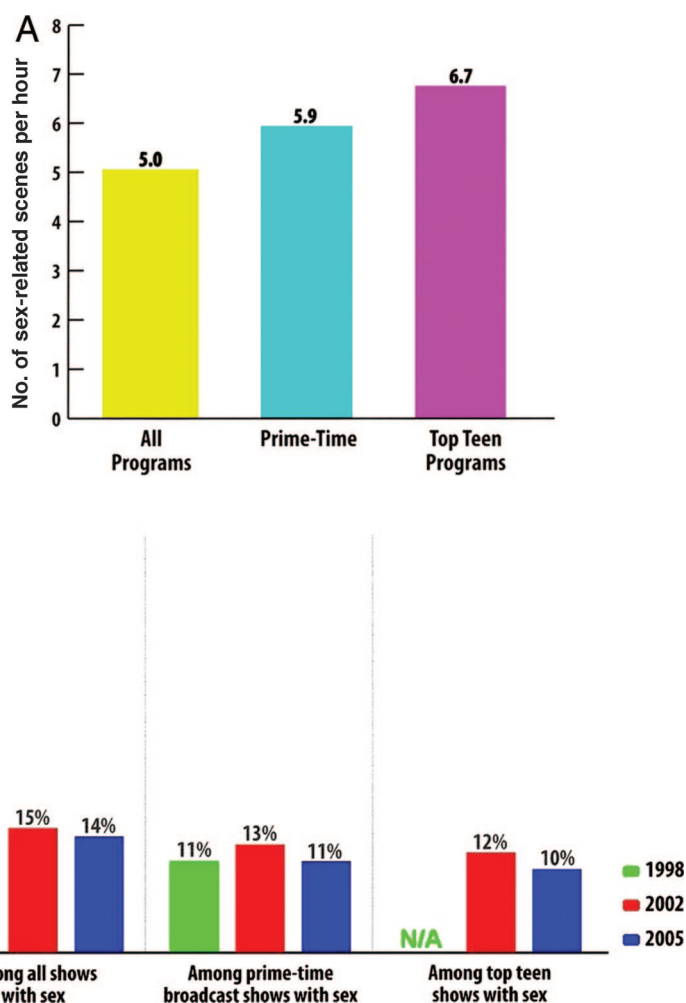


FIGURE 5

A, Programs for teenagers actually contain more sexual content than adult-oriented programs. B, Despite the prevalence of sexual content on television, fewer than 14% of shows contain any mention of the risks and responsibility of sexual activity. (Reproduced with permission from Kaiser Family Foundation. Sex on TV 4, Executive Summary 2005. Available at: www.kff.org/entmedia/upload/sex-on-TV-Executive-Summary.pdf. Accessed December 2, 2009; 5, 7.)

Television shows geared toward teenagers actually have more sexual content than adult-oriented shows (Fig 5A), yet there is little mention of the need for contraception or for responsibility (Fig 5B).⁴⁶ Virtually every Western country makes birth control available to adolescents, including allowing birth control advertisements in the media, but the major US television networks balk at airing ads for contraception.⁴⁷ This flies in the face of the fact that a substantial body of evidence shows that giving teenagers access to condoms does not lead to earlier sexual activity.⁴⁵

Parents and child advocates often express concern over children connecting with strangers on-line. Although there have been disturbing cases of Internet sexual predatory activity by adults on children,⁴⁸ most recent studies of Internet safety have suggested that sexual solicitation of minors is more likely to occur by other minors.²¹ Social networking sites such as MySpace and Facebook enable adolescents to present themselves publicly,³⁶ sometimes in very sexually suggestive ways⁴⁹; however, adult on-line predators are not using social networking sites to find or entice their victims.⁵⁰ One na-

tional survey of “sexting” with cell phones, conducted with 13- to 19-year-olds, revealed that 20% had sent and 48% had received sexual messages.⁵¹ However, social networking sites can also be used prosocially for safer-sex campaigns, for example.⁵²

Substance Use

In the United States, more than \$22 billion is spent marketing and advertising drugs (\$13 billion on tobacco, \$5 billion on alcohol, and \$4 billion on prescription drugs), and many research studies have shown that it has a significant impact on adolescent use.^{6,53–56} Children and teenagers can also see considerable alcohol and drug content in on-line videos.⁵⁷ Recent studies of social networking sites have found that substance abuse is referenced in 40% of the profiles.^{58,59}

Portrayals of tobacco are also prevalent in the movies: ~70% of movies made in the United States today contain smoking, and smoking is rarely associated with negative health outcomes.⁶⁰ Longitudinal prospective studies have revealed that exposure to movie smoking at baseline (grades 5–8) predicts smoking initiation 1 to 8 years later.^{60,61} Experimental research has helped illuminate why exposure to movie characters’ smoking is associated with smoking initiation: viewers who identify with the storyline and the characters are more likely to increase their intention to smoke.^{62–64}

Obesity and Eating Disorders

Numerous American and international longitudinal studies (one of them as long as 26 years in duration) have shown that media use is contributing to the current epidemic of obesity worldwide.⁶⁵ However, the mechanism for why heavy television-viewing, in particular, is predictive of children’s weight status is unclear. Food marketing may be 1 culprit. Children and teen-

agers see 4400–7600 ads per year for junk food and fast food on television alone.⁶⁶ Randomized, controlled experiments have provided evidence that exposure to junk food advertising has an impact on children’s food beliefs and preferences.^{67,68} The Internet now presents a new concern. As the Kaiser Foundation noted, “There is a vast amount of food related content online, with the potential to significantly expand and deepen children’s exposure to food marketing messages.”⁶⁹ (p 32)

Apart from the influence of advertising, eating while viewing may lead to greater food consumption.^{70–72} College-aged students showed significantly greater consumption of food when subjects were watching television versus listening to classical music.⁷⁰ The investigators hypothesized that satiety cues are suppressed in viewing conditions. Although the evidence that television-viewing displaces physical activity is equivocal,^{65,73} researchers are now examining whether heavy media use, particularly at nighttime, displaces sleep.¹³ Children who do not get enough sleep are more likely to engage in sedentary behaviors (such as television-viewing) and less likely to engage in physical activity.^{13,65}

The media play a crucial role in the formation of body self-image and may be responsible for creating unrealistic expectations and body dissatisfaction.^{74,75} Females who are regular readers of fashion and beauty magazines in early adolescence are more likely to suffer from a distorted body image during their teenaged years.^{74,75} A natural field experiment in Fiji revealed that the prevalence of eating disorders increased dramatically after the introduction of American television programs,⁷⁶ which show excessively thin female lead characters. On the Internet, there are now >100 pro-anorexia Web sites that not only en-

courage disordered eating but offer specific advice on purging, severely restricting caloric intake, and exercising excessively.⁷⁷

Developmental Concerns

Heavy television-viewing (>2–3 hours/day) in early childhood has been linked with attention-deficit disorder (ADD) during the early school years.⁷⁸ Although the direction of the effect is not yet clear (ie, do children with shorter attention spans have greater affinity for television-viewing, or does television-viewing cause attention problems?), it does suggest the need for more research. In addition, there are now 7 studies that have documented the possibility of language delays among infants exposed to excessive television or videos^{8,79–84} and no studies to indicate that such screen time contributes positively to early infant development.⁸⁵

School Performance and Learning Problems

The possibility of a connection between television-viewing and ADD or other learning disabilities is currently an issue of great controversy. An initial study in 2004 revealed an association between daily hours of television-viewing at the ages of 1 to 2 years and subsequent attentional problems at the age of 7.⁸⁶ However, a more recent study in which 59 children with ADD and 106 comparison children were examined actually revealed that the latter had more impairment in their cognitive processes after viewing television than the former.⁷⁸ At least 4 studies have shown an impact on academic performance,^{87–90} especially if there is a television set in the child’s or teenager’s bedroom.⁸⁹

Other Health Effects

Heavy television-viewing has also been associated with hypercholesterolemia,^{91,92} hypertension,^{92–94} an in-

creased prevalence of asthma,⁹⁵ sleep disorders,⁹⁶ mood disorders,^{97,98} psychological distress,⁹⁹ and depression.¹⁰⁰ These were largely correlational studies and, therefore, did not necessarily show cause and effect.

Prosocial Effects

Despite the negative effects listed above, the media can be powerfully prosocial and educational.^{7,83} Children and teenagers can learn antiviolence attitudes, empathy, tolerance toward people of other races and ethnicities, and respect for their elders.^{6,7,83} Video games can be beneficial as well,¹⁰¹ including improving compliance with chemotherapy regimens in adolescents with cancer.¹⁰² Important and useful public messages can be successfully embedded into primetime television shows that are popular with adolescents. In an episode of the television program *Friends*, for example, Rachel tells her boyfriend Ross that she is pregnant although they had used a condom. A national telephone survey conducted with *Friends* viewers after the episode aired found that adolescents learned that condoms are not fool-proof and were more likely to discuss contraception with their parents.¹⁰³ Similarly, a recent episode of *Gray's Anatomy* was effective in teaching viewers about HIV and pregnancy.¹⁰⁴

Research into the impact of digital media on relationship formation and maintenance has revealed that on-line communication and on-line self-disclosure can stimulate adolescents' social connectedness and, thereby, their well-being.¹⁰⁵ However, the benefits of socializing on-line are not equal for every child or adolescent. The positive Internet effect holds only when adolescents predominantly talk with their existing friends.^{106,107} Communication technologies that are most often used to communicate with stran-

gers (eg, chat in a public chat room) or more solitary forms of Internet use (such as surfing the Web) have negative effects on social connectedness.¹⁰⁸

SOLUTIONS

The potential for media to play a beneficial role in the lives of children and youth has not been fully realized, and strategies for reducing the negative effects can be implemented.

Parents

The American Academy of Pediatrics (AAP)¹⁰⁹ has recommended that parents (1) limit total screen time for children older than 2 years to no more than 1 to 2 hours/day, (2) avoid screen time for children younger than 2 years, (3) keep children's bedrooms free of screen media; and (4) co-view media with their children and discuss the content. The AAP has a Web site that deals specifically with Internet safety issues (<http://safetynet.aap.org>). Although 65% of >1000 parents surveyed nationally in a recent study reported that they "closely monitor" their children's media habits,¹¹⁰ parents typically report that their children use less media than children themselves report.¹¹¹ As an important first step, therefore, health care providers should encourage parents to be more cognizant about children's media time. Parents also need to avoid exposing young children to PG-13- and R-rated movies,^{112,113} given the prevalence of violent and sexual content in higher-rated films²⁸ and the new evidence that movie scenes that depict drinking alcohol and smoking may be very influential in teenagers' decisions to use alcohol and tobacco.^{56,64,114} In addition, parents can be mindful of their own media practices, because studies have shown that the strongest predictor of children's heavy media use is parents' heavy media use.¹¹⁵ Parental efforts to interpret, elaborate, and provide supplemental information on topics intro-

duced by television have been found to be successful in countering negative or harmful content.⁶ In a recent study on exposure to sexual media content, adolescents who report that they discuss the content of what they see on television are less likely to engage in risky sexual activity.¹¹⁶

Practitioners

A 2004 survey of 365 pediatricians revealed that only half recommend limiting screen time according to the AAP recommendations, and half said they were not interested in learning more about media influences on their patients.¹¹⁷ Yet, just a few minutes of office counseling could result in nearly 1 million children adhering to the AAP guidelines of <2 hours of screen time per day, according to 1 study.¹¹⁸ Clinicians who see children need to understand that spending a minute discussing children's media use may be as important as explaining the importance of a bicycle helmet, particularly if a child is showing signs of school difficulty, aggressiveness, disordered eating, or poor sleep patterns. Two questions are useful to pose to parents in the clinical setting: (1) How much time per day does the child or teenager spend with entertainment media? and (2) Is there a television set or Internet connection in the child's bedroom?^{219,120} Parents should be encouraged to avoid putting a television set in the child's bedroom to begin with or to remove it once it is there. For households with teenagers, the computer with the an Internet connection is best placed in a living room or den where there is heavy adult traffic.

Traditionally, continuing medical education programs for physicians have been planned along subspecialty lines. However, given that the media have an impact on virtually every concern that clinicians and parents have about children and adolescents, physicians

need more information about media effects, such as the impact on teenaged sex, drug use, suicide, or school achievement.

Schools

Schools have not kept pace with modern media, especially in violence prevention, drug prevention, and sex education programs. With the amount of sexual suggestiveness currently displayed on television and in movies, schools no longer have any excuse for not providing comprehensive school-based sex education programs for children and adolescents, including full discussions of contraception¹²¹ and discussions of how sex and sexuality are portrayed in the media. Similarly, drug education programs must progress beyond scare tactics to incorporate principles of media education, teaching young people how to deconstruct alcohol and tobacco ads and, therefore, become more resilient. Media education is crucial. A century ago, to be “literate” meant that one could read and write; in 2009 it means having the ability to decipher a bewildering array of media and make sense of them all. Several countries, including the United Kingdom, Canada, and Australia, mandate such education in their schools.¹²² Few American schools teach media education, but studies have shown that it may be useful in mitigating harmful media effects.^{110,122–127} Even the use of new technologies can be affected through media education; 1 study revealed that teenagers can be responsive to messages about the dangers of posting sexual references in their profiles on social networking sites, for example, and will alter their on-line behavior accordingly.¹²⁷

Entertainment Industry

There is tremendous positive potential to provide millions of people with accu-

rate and important health information through mass media. The United States continues to have the highest teenaged pregnancy rate in the Western world,¹²⁸ and there is new evidence that it is now increasing rather than decreasing.¹²⁹ Given these facts, increasing responsible sexual content in mainstream media and advertising contraceptives widely would seem to be an urgent public health goal.⁴⁵ Several studios have agreed to add anti-smoking advertisements before feature films on new DVDs, and Disney has announced that it will no longer permit smoking in Disney movies.¹³⁰

Industry ratings systems have sometimes been confusing for parents, although the majority have indicated that they rely on the information at least sometimes in their mediation efforts.¹¹⁰ For example, several national surveys of parents revealed that <10% of parents understand that the television rating “FV” indicates “fantasy violence”.^{6,115} One major help for parents would be a universal ratings system for all media instead of the “alphabet soup” that currently exists separately for television, movies, and video games.⁶

Advertising Industry

The United States spends \$250 billion per year on advertising,¹³¹ yet advertisers continue to claim that they are only trying to influence brand choice, not consumption. There are good data that show that advertising does increase consumer spending by children¹³¹ and the products most advertised to children may not be the healthiest for them (eg, junk food and fast food),^{131,132} whereas other products are woefully underadvertised (eg, healthy food, contraceptives).^{45,132,133} Given the new potential of digital advertising to reach an increasingly younger audience, it seems vital to establish appropriate advertising ethics for what can and cannot be advertised to

certain age groups.¹⁸ In particular, with the epidemic of obesity now spreading worldwide, some experts have suggested that limits be placed on advertising junk food and fast food to children and adolescents,^{65,68,73,134} a move that, in the United Kingdom, has resulted in a decrease in young audiences’ exposure to products linked with childhood obesity.¹³⁵ Researchers in Australia have also documented that advertising healthy foods to children can increase positive attitudes toward the food and children’s willingness to choose healthy food as a snack.¹³⁶

Researchers

Many current studies of risky behaviors among adolescents, including drug use, sexual activity, and eating disorders, completely ignore the possibility of media influence.¹³⁷ Researchers need to incorporate measures of media use (and impact) into their studies of child and adolescent behavior. Longitudinal studies with children and adolescents representative of the population are needed to better understand the cumulative effect of media on the developing child and the differential effects of the media on distinct subpopulations of children.⁷³

Government

The Children’s Television Act of 1990, which mandates 3 hours/week of educational or informational programming for children on broadcast television networks, has not been rigorously enforced.¹³⁸ With the explosion in digital media, and with a new presidential administration, Congress is revisiting children’s media policy with the Federal Communications Commission and the Federal Trade Commission.¹³⁹ It is critical for research experts and health care professionals to contribute to these deliberations. In addition, the government should appropriate much-needed funding for research with emerging media (such as social networking sites and

interactive digital television) and newly cultivated audiences (such as infants and toddlers). The Children and Media Research Advancement Act, currently stalled in Congress, is an example. Finally, through the National Institutes of Mental Health, the government could also issue an omnibus report to update current knowledge of media effects on children and adoles-

cents. The last such report was in 1982, well before the Internet, cell phones, and interactive advertising.¹⁴⁰

CONCLUSIONS

During the past 50 years, thousands of research studies have revealed that the media can be a powerful teacher of children and adolescents and have a profound impact on their health. To

date, too little has been done by parents, health care practitioners, schools, the entertainment industry, or the government to protect children and adolescents from harmful media effects and to maximize the powerfully prosocial aspects of modern media. More research is needed, but sufficient data exist to warrant both concern and increased action.

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