

**Testimony of
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Children's Hospital Boston/Harvard Medical School
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Thank you for the opportunity to testify before you today as a pediatrician, as a child health researcher, as a media producer, and as a parent. My name is Dr. Michael Rich. I am the director of the Center on Media and Child Health, an interdisciplinary research center dedicated to understanding the effects of entertainment media on the physical, mental, and social health of children and adolescents. I practice pediatrics and adolescent medicine at Children's Hospital Boston and I teach at Harvard Medical School and Harvard School of Public Health. In my research, I investigate the effects of entertainment media on the physical, mental, and social health of children and adolescents and I develop pro-child and health-positive media as tools for research, education, and advocacy. Finally, and most importantly, I am the father of three lovely children, whom I want to grow up healthy, safe, and free.

The Effects of Media on Child Health

One hundred years ago, the leading causes of illness and death in children were infectious diseases and congenital anomalies. Physicians tried, often unsuccessfully, to cure the afflicted. More successfully, they, along with public health workers and other scientists, sought to prevent these scourges by discovering and intervening on the causes. Those causes were founded to be environmental - poor sanitation, crowded housing, and pollution. Today, the greatest health risks of children and adolescents are the results of acquired health risk behaviors - violence, substance use, sexual risk behaviors, and nutritional problems from obesity to eating disorders. The top three causes of death in adolescents are violent in nature - unintended injury, homicide, and suicide. Just as the environmental causes of disease and death were discovered and addressed a century ago, we must examine the new environment of the Information Age to determine the sources of the new morbidities.

The medical community first voiced concern about the effects of media on child health in the early 1950s, shortly after the introduction of television to the general public. Since that time, media technologies have grown exponentially, in variety, in sophistication, and in the potency of their effects on their users. With the advent of new media and its ever rising popularity among children and adolescents, new and pressing questions are at the forefront of the minds of parents, teachers, and policy makers like you. Video games and the extreme content that they can deliver are justifiably at the center of these questions.

In approaching the issue of video games as a potential public health problem, it is essential to answer questions about the prevalence and consequences of their use. Furthermore, by describing the mechanism through which consequences are brought

about, effective interventions can be suggested. Finally, previously implemented strategies and their level of success should be noted.

- 1) What is the prevalence of video game use?
- 2) What are the physical and psychosocial consequences of video game play?
- 3) How does video game use translate into consequences?
- 4) What interventions can prevent these consequences and how successful have previous interventions been?

Video games are challenging television as the medium of choice in the homes of American families. In 2000, 68% of families with children between the ages of 2 and 17 had a video game system in their home, and about 1/3 of these children had a gaming system in their room. Many children are, of course, taking advantage of this easy access. Approximately one out of every three children play video games on a daily basis, spending an average of one hour a day gaming. Not surprisingly, boys play more often than girls; among video game players between the ages of 2 and 12, boys play about 6 hours and 13 minutes a week and girls play 4 hours and 24 minutes a week. Additionally, video games of all types are available for free download on the Internet making access to specific games even easier for young children. Even 10% of toddlers and preschoolers play video games. For some young men, video game play takes a larger time commitment than a part-time job - in 1999 2.5% of male college freshman played video games more than 20 hours a week.

Considering the increasing amount of time children and young adults spend with these games, the physical consequences of the activity need to be explored. Video games, and especially violent video games, arouse their players. Heart rate and blood pressure increase during game play. In one study, children who played video games for more than 1 hour a day were more likely to show signs of sleep deprivation such as black rings under the eyes and muscle stiffness in their shoulders. For some children video game play has been documented to be related to video-induced seizures, tendonitis, nerve compression, and carpal tunnel syndrome. Finally, there is growing evidence that video game play may contribute to obesity, probably through increasing sedentary behavior in otherwise active children.

From the perspective of child health professionals, however, concern about physical problems associated with video game play pale in comparison to those related to potential effects on young people's psychological and social health. Video games are technologically brilliant, interactive, and immersive virtual reality experiences. They create virtual worlds and characters with whom the player interacts. The game player is the main character in a narrative that plays out in real time. He or she is posed with a series of increasingly difficult challenges, attempting them over and over again, until each is overcome and the player rewarded with points and a new challenge. Video games are virtual reality simulators of a variety of activities, presenting and rehearsing what psychologists call "behavioral scripts," patterns of response to experience. Their engaging, even addicting, virtual reality environments in which players strive and fail, strive and succeed over and over again, are believed to be among the most powerful and

effective teaching tools yet devised. Children are learning from video games. The question is – what are they learning?

Popular video games are all too often experiences of intense and graphic violence. Video games that simulate violent scenarios are by far the most popular: 53% of 7th-8th graders listed a video game containing fantasy violence among their favorites. In 2001, games that awarded points for violence against others represented 89% of the top sellers. For more than 50 years, researchers have documented the relationship between televised violence and aggressive beliefs, attitudes, and behaviors. Hundreds of studies have nearly unanimously shown that simply watching violent behaviors can cause increased anxiety and fear, desensitization to violence, and aggressive thoughts and behaviors in viewers. Studies have demonstrated that entertainment violence that is narratively associated with pleasurable feelings such as comedy or sexual attraction has a much more potent effect on viewers' aggressive attitudes and actions. The large body of research indicating that exposure to violent content is a causal component of aggression, provides a foundation for researching the effects of violent video games. There are reasons, however, to hypothesize that video game effects are stronger than those of passively viewed media. Reward structures within violent video games associate pleasure with human death and suffering and reinforce the rehearsal of violent behavioral scripts. To win these games, players must act aggressively, and they must do it well.

Video games are rapidly evolving. Research to date has been both limited and hampered by research designs that have lagged behind game technology. Early studies on the effects of video games met with wide ranging critiques and the conclusions of some scholars that their findings were inconclusive. Methodological problems resulted in the first meta-analyses underestimating the effects of violent video game play. Recent, more sophisticated meta-analysis, however, has found an effect size of violent video game play on aggressive behavior of .20 (this is similar to the effect size of condom use on sexually transmitted HIV, and is stronger than the association between lead exposure and IQ in children). When violent thoughts are the outcome, the effect of violent video game play is even stronger at .26. Overall, the research in this area shows that violent video games are linked to physiological arousal, aggressive thoughts, affect, and behavior, and decreases in helping behavior. Studies performed in a laboratory setting show that there is a causal relationship between video game play and aggression, while large correlational studies show that video game play has effects on real-world behaviors.

At the Center on Media and Child Health, we are using techniques of biomedical and public health research to examine critical areas of media effects. We are examining the disparities of media exposure – in short, do children of lower income, who live in more dangerous neighborhoods, and who have working parents, have higher levels of exposure to television and video games? We are investigating media effects as a common pathway to bullying in our schools, which is not only a growing problem in itself, but has been implicated as a motivator in all of the tragic school shootings in recent years. We are finding that children may learn their roles as bully, victim, or bystander, all of which are necessary for bullying to occur, early in life from media role models. Finally, we are using functional MRI to examine the brain activations of children when exposed to

violent compared to non-violent material. Pilot data indicate that unique areas of a child's brain are activated with violence – primitive areas on the right side of the brain which predominantly processes negative material. When viewing violence, the amygdala, our “fight or flight” center, and motor planning areas are activated. To our surprise and concern, what also fired was the posterior cingulate, the brain center that is activated in post-traumatic stress disorder patients when they relive their traumas. This is an area of long-term, permanent memory encoding, the “survivor’s ROM” if you will, and it explains why we see increasing aggressiveness with increased exposure to violent material.

According to the General Aggression Model proposed by Craig Anderson and Brad Bushman, violent video game play has both short and long term effects on children. Immediately after playing a game, children are primed for hostile thoughts and behaviors: they are more likely to attribute a person's behavior to hostile intent. Participants in laboratory studies who play violent games are more likely to punish a confederate opponent in a competitive task. It is, therefore, easy to imagine how a child primed with aggressive thoughts and hostility is likely to behave more violently in the next encounter with another person, especially if any level of conflict is evident.

Over the long term, children learn violence by playing violent video games. The narratives that play out in these games constitute detailed belief structures about human behavior, aggression, expectations of others' aggression, and what it takes to prevail in such an environment. These behavioral scripts are rehearsed and reinforced every time a child plays a violent video game. Ultimately, the effects are cumulative – the general aggressiveness of the child's personality increases and this, in turn, influences his or her tendency to behavior aggressively in future encounters.

Reducing children's exposure to violent games is more effective than intervening after exposure. In an intervention study, children who were involved in a program designed to reduce television viewing and video game play were shown to have a reduction in peer-rated aggressive behaviors. Well designed programs teaching children alternative activities can be effective at reducing media use and the negative behavioral consequences associated with it.

In order to inform parents about the content and age appropriateness of their video games, the video game industry created and implemented a rating system. The Entertainment Software Ratings Board (ESRB) applies these voluntary ratings to every game that is submitted for review. Three trained raters chosen by the ESRB individually assign ratings using video of the submitted game along with a detailed content questionnaire completed by the game's producer. The ratings system has included 5 age ratings: EC for early childhood, E for everyone, T for Teen, M for Mature, and AO for Adults Only, with a recently introduced E-10 for everyone 10 and older as well. These ratings can be supplemented with a large number of specific indicators of potentially offensive content (including violence, sexuality, nudity, blood, and drug use). Unfortunately, none of the ESRB raters are child development experts and their goal is

not to determine what is healthy or safe for children, but to decide what parents would find acceptable for children of various ages.

For a rating system to effectively limit children's access to adult content, two goals must be met: 1) Parents must be aware of the system, understand it, and use it to make decisions about what games they provide their children, and 2) The assigned ratings must accurately represent the content of the games. In a study by the Kaiser Family Foundation, 52% of the parents surveyed said they use the rating system to guide their game purchases. When adolescents were surveyed in a separate study, only 19% said that their parents had ever prevented their child from getting a game because of the rating, and 53% of the respondents said that their parents never check the rating of a game before allowing their child to purchase it.

Panels of parents have been used to determine if, in general, parents agree with the ratings applied by the ESRB. Approximately 1/3 of the E-rated games that the parents reviewed were deemed questionable or inappropriate for their targeted 3 to 7 year old players. Of T-rated games, parents considered 57% inappropriate for general teen audiences.

Researchers at the Center on Media and Child Health, among others, have used content analyses to validate the ratings applied to video games. E-rated games have been found to contain violence 64-79% of the time, and 94% of T-rated games contain violence. About half of the T-rated games studied contained content that was not included in the content labels for the games. These results call into question the validity and usefulness of the ESRB rating system as it currently stands. Until an objective, consistent, and developmentally appropriate video game rating system is put in place, parents will not have a reliable tool for protecting their children.

Effective media ratings are important to us as individuals and as a society. Designed and used properly, they allow us to create and consume a variety of media while protecting both child health and creative freedom. Censorship is anathema to our free society. It suppresses the free expression of ideas, and stifles both science and culture, the mind and soul of our society. As a filmmaker, I know and love the possibilities of media, and I respect them. What I seek, as a pediatrician and as a parent, is a means whereby game makers can create and sell whatever they wish, and parents and children can choose those games knowledgeably and use them in safety. We have established means for ensuring the safety of what we feed our children's bodies, we need the same means for ensuring the safety of what we feed their minds. Entertainment media are not inherently dangerous. They are a powerful tool that must be used thoughtfully and wisely. Just as the same shovel can be used to hit someone over the head or to prepare a field for planting, so, too, media can harm or help. Let us remember that on September 11, 2001, people who had trained on flight simulators, played video games of flying jets, learned to fly well enough to reduce our tallest buildings to rubble. Each day thousands of children entertain themselves with games that simulate killing others with their bare hands or a variety of realistic weapons, that reward them for robbery, rape, and murder. What we teach our children today will determine the world they create for all of us tomorrow. It is

our task, as parents, as citizens, and as compassionate people, to do what we can to teach our children the lessons and to give them the tools that will help them make their world safe, healthy, and free.