REPORT OF THE COUNCIL ON SCIENCE AND PUBLIC HEALTH

CSAPH Report 6-A-13

Subject: Electronic Games and Health Promotion

Presented by: Sandra A. Fryhofer, MD, Chair

Referred to: Reference Committee D
(Douglas W. Martin, MD, Chair)

INTRODUCTION

Policy D-170.993, "Electronic Games and Health Promotion," directs our AMA to review and report on health-related use of electronic games, types of games that are available, and games that could be recommended by physicians for targeted patient populations.

BACKGROUND

The electronic gaming industry has been part of American culture since the late 1950s beginning with video games. It has grown exponentially in the last 20 years to include devices such as computers and smartphones. In 2011 alone, consumers spent $24.75 billion on video games, hardware and accessories.[1] Today, the average U.S. household owns at least one dedicated game console, PC, or smartphone.[1] While electronic games are often thought of as child's play, the average game player today is 30 years old and has been playing games for 12 years.[1] Video games are often associated with males, however, 47% of all game players are women.[1] No longer a single player form of entertainment, 62% of gamers play games with others, either in-person or online.[1] These data lend credence to the notion that the health-related use of electronic games could potentially impact a wide range of individuals, including those who are difficult to reach with traditional messaging. Potential areas of influence include physical fitness, healthy habits, treatment, rehabilitation, as well as medical training for professionals.

Electronic games have often been the subject of controversy because of potential negative health implications associated with sedentary lifestyles or psychosocial effects. The Council previously studied the emotional and behavioral effects of video games and internet overuse.[2] While the effects and potential harms (including behavioral problems related to aggression) of video game usage in American youth have undergone increased public scrutiny, such games have a potentially positive role to play in the arenas of health care and health education. AMA Policy D-60.974, "Emotional and Behavioral Effects of Video Game and Internet Overuse," encourages research on the positive effects of video games for people under age 18. See the Appendix for other AMA policies related to video games. This report focuses on research related to the positive use of electronic games for health improvement in the public and patient populations.

METHODS

English-language reports on studies involving human subjects were selected from a PubMed search of the literature from 2002 to February 2013 using the search terms, "video game," "electronic

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Action of the AMA House of Delegates 2013 Annual Meeting: Recommendations in Report 6 of the Council on Science and Public Health Adopted, and Remainder of Report Filed.

game," "game for health," and "health game." Additional studies and resources were identified from the reference list of materials reviewed.

TYPES AND USES OF ELECTRONIC GAMES FOR HEALTH BENEFITS

The use of electronic games for health improvement is an area of emerging research. Settings include homes, schools, hospitals, clinics, and community centers. Some games require physical interaction, whereas other games are non-active but are intended to be educational. Games also exist that combine efforts to increase knowledge with changes in attitudes and behaviors. Examples of innovative products include games for school-aged children to learn about nutrition, games for adults to aid in smoking cessation, games for seniors to demonstrate exercise, and games for college students which promote healthy lifestyles.[3]

Non-active games can increase knowledge and influence behavior change. For example, a game targeting adolescent cancer patients improved adherence to chemotherapy and treatment plans.[4] Games that promote skill-building, virtual immersion in stories via avatars, goal setting, and situation simulation have shown promise in changing behavior; specific outcomes vary depending on game complexity.[5] Video games also have shown success in improving cognitive functions in healthy older adults, including task switching, working memory, visual short-term memory, and reasoning.[6,7]

Active games also have shown promise for increasing an individual's physical activity. For example, one such game called Dance Dance Revolution (DDR) introduced in 1998 has sold nearly 16 million units worldwide.[8] A 2005 study of DDR demonstrated that children dancing for 45 minutes doubled their resting heart rate and increased their metabolism and calories burned.[9] The popular Nintendo Wii (2006) and Wii Fit (2008) gaming systems offer a variety of active games from boxing to tennis. Energy expenditure during active video games varies depending on weight, gender, intensity, and duration of activity.[10] A recent study of Wii Fit games found that level of enjoyment influences frequency of game usage, thereby impacting energy expenditure. Aerobic games were found to produce greater energy expenditures than balance games (~ 2.7 $kcal/kg^{-1}/hr^{-1}$) although they were rated less enjoyable. Participation in aerobic games identified as more enjoyable produced greater energy expenditure than aerobic games designed to emphasize exercise alone.[11] One variable related to health promotion is that the nature of many active video games is often intermittent, thereby detracting from the gamer's ability to sustain movement and maintain aerobic exercise.[10] For further information on the use of electronic media-based health interventions for promoting behavior change in youth (including physical activity and nutrition choices), see the recent systematic review by Hieftje et al.[12]

Other electronic games have the potential to enhance motor learning and training for cardio-vascular and musculoskeletal systems, and balance. For example, a study of patients in intensive care units indicated that active video game use is feasible and can complement routine physical therapy intended to improve balance and endurance.[13] Another study of patients with spinal cord injury who used active video games requiring only upper limbs demonstrated increases in metabolic rates.[14] Some believe that more investigation is needed to determine how to best include electronic games in clinical settings without disturbing the clinician-patient relationship, citing concerns regarding efficacy, suitability and safety.[15]

RESEARCH AND EVALUATION

As the field of electronic games for health continues to evolve, the challenge for designers, researchers, and health professionals is how to evaluate effectiveness. While games may impact

short-term behavior among players, greater attention should be given to the design of games which promote long-term behavior change and are rooted in behavioral theories.[16,9] The Robert Wood Johnson Foundation (RWJF) has invested in such research and evaluation. *Health Games Research (HGR): Advancing Effectiveness of Interactive Games for Health* is a national program founded in 2008 and headquartered at the University of California, Santa Barbara; funding is devoted to research that enhances the quality and impact of electronic games for health improvement.[17] HGR encourages collaboration and creativity between design teams and researchers in order to develop new health games and game technologies that are engaging and enjoyable while at the same time can improve players' health-related behaviors and outcomes. HGR currently funds 21 research projects nationwide and hosts the annual Games for Health conference. Also, HGR created an online searchable database (http://www.healthgamesresearch.org/db) which provides information about hundreds of games, as well as related publications and resources. This database can be useful to health professionals and their staff who are interested in providing such information to their patients.

In May 2011, the National Heart, Lung, and Blood Institute, in collaboration with the Department of Defense Telemedicine and Technology Research Center, announced a grant program to foster healthy eating and physical activity, as well as self-care and other related behaviors. The goal of the program is to "develop the potential of virtual reality technologies as research tools for behavioral science-oriented studies in diabetes and obesity, and as practical tools for clinical and public health-level prevention and management of these conditions."[18] The findings from this research may inform electronic game designers and health professionals alike.

Games for Health: Research, Development, and Clinical Applications is a new peer-reviewed journal that launched in 2012. The purpose of the journal is to create a forum for leaders in electronic gaming and those who research, recommend, design, publish, fund, and invest in electronic health games.[19,20] While new, this journal intends to centralize emerging research and provide a consistent framework for evaluation.

CONCLUSIONS

A number of studies have been published in the last decade indicating that electronic games can be used for health improvement, including behavior change, particularly those that include goal-setting and the use of story.[12,21] Active video games have the potential to improve otherwise sedentary behavior. Electronic games are indeed capable of providing light-to-moderate intensity physical activity, but they may not be able to significantly improve physical conditioning.[22] Game designers are challenged to integrate more physical activity into enjoyable games, rather than just creating more exercise-themed games.[11] Substantial variability among studies of electronic games exists, including differences in game design, educational theories employed, and targets for change. This variability has made it difficult to equate game characteristics with outcomes. The potential for video games to promote improvements in health and safety behaviors, particularly in youth, calls for further research and more scientifically rigorous evaluation.[12]

Some of the appeal in using electronic games for health improvement is grounded in the fact they are relatively short in duration, replicable, commercially available, and relatively low cost. While much of the literature seems to focus on the impact of electronic games on children, more research on the adult population would be valuable, given that the average age of game players is 30 years. For health care professionals, it would be helpful for game-makers to provide information on design principles and objectives in order to best determine suitability for patients. Wider promotion and dissemination of the results of the RWJF Health Games Research program could aid in that effort. (http://www.healthgamesresearch.org/db)

RECOMMENDATION

The Council on Science and Public Health recommends that Policy D-170.993 be rescinded and that the remainder of this report be filed. (Rescind HOD Policy)

Fiscal Note: Less than $500

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APPENDIX

D-170.993 Electronic Games and Health Promotion
Our AMA will review and report on health-related use of electronic games, types of games that are available, and games that could be recommended by physicians for targeted patient populations. (Res. 428, A-12)

D-60.974 Emotional and Behavioral Effects of Video Game and Internet Overuse
Our AMA:
(1) urges agencies such as the Federal Trade Commission as well as national parent and public interest organizations such as the Entertainment Software Rating Board, and parent-teacher organizations to review the current ratings system for accuracy and appropriateness relative to content, and establish an improved ratings systems based on a combined effort from the entertainment industry and peer review;
(2) will work with key stakeholder organizations such as the American Academy of Pediatrics and the American Academy of Family Physicians to (a) educate physicians on the public health risks of media exposure and how to assess media usage in their pediatric populations and (b) provide families with educational materials on the appropriate use of video games;
(3) supports increased awareness of the need for parents to monitor and restrict use of video games and the Internet and encourage increased vigilance in monitoring the content of games purchased and played for children 17 years old and younger;
(4) encourages organizations such as the Centers for Disease Control and Prevention, the National Science Foundation, and the National Institutes of Health to fund quality research (a) on the long-term beneficial and detrimental effects not only of video games, but use of the Internet by children under 18 years of age; and (b) for the determination of a scientifically-based guideline for total daily or weekly screen time, as appropriate; and
(5) will forward Council on Science and Public Health Report 12-A-07, Emotional and Behavioral Effects of Video Game and Internet Overuse, to the American Psychiatric Association and other appropriate medical specialty societies for review and consideration in conjunction with the upcoming revision of the *Diagnostic and Statistical Manual of Mental Disorders*. (CSAPH Rep. 12, A-07)

D-515.991 Labeling of Video Game Content
Our AMA will actively campaign for appropriate labeling of any video game that depicts acts of violence or aggressive acts so that these videos will be made available for purchase by adults only. (Res. 421, A-05)

D-515.988 Warning Labels on Video Games
Our AMA Council on Science and Public Health will: (1) work in conjunction with all appropriate specialty societies to prepare a report reviewing and summarizing the research data on the emotional and behavioral effects, including addiction potential, of video games; and (2) develop recommendations for physicians, parents and legislators based on the findings of this report. (Res. 421, A-06)