

**Health & Medicine**

# Not Just Child's Play

**With their unique ability to distract, educate, and entertain, video games are increasingly being used to help heal and soothe the sick**

By Betsy Streisand

**A** teenager with Hodgkin's lymphoma blasts away at cancer cells in a computer game, all the while learning to do a better job of conquering her own cancer. A traumatized soldier returns to the cybergenerated streets of Iraq, in the hopes that he may be able to one day cope with the horrors of war. A young boy with severe burns delves into a virtual wonderland of snowmen, penguins, and snowballs, escaping, if only for a little while, the unbearable pain of having his wounds cleaned and dressed twice a day.

Welcome to the upside of computer games. Their legendary powers of distraction and ability to create synthetic worlds are turning one of the most popular—and disparaged—entertainment media into a promising and potentially powerful medical tool. Long derided as the enemy of health for transforming children into weapon-loving, overweight zombies, computer games are now proving effective for everything from reducing pain and managing chronic disease to treating post-traumatic stress disorder and promoting fitness and exercise. Although these so-called serious games are still in their infancy, there's a growing body of evidence backing their health-improvement claims. "Games can be extremely motivational and useful in therapeutic and medical settings," says Albert "Skip" Rizzo, a clinical psychologist and director of the Virtual Environments Lab at the University of Southern California. "There are a lot of researchers looking at this technology because it makes things fun, and it's very engaging."



**Take that.** Anyone who doubts this characterization need only attempt to come between a child and a Game Boy. Yet marshal that same hyperfocus in the service of, say, reducing pain, and it becomes a virtue. In *Re-Mission*, for instance, a new computer game for young cancer patients, the Tomb Raider-ish Roxxi leads players on a biological journey through the body. The patients zap cancer and infectious cells with chemotherapy and antibiotics, reinforcing the importance of keeping up treatment. The game is the brainchild of HopeLab in Palo Alto, Calif., a nonprofit founded by Pamela Omidyar (the wife of eBay founder Pierre Omidyar) that focuses on improving the health and quality of life of young people with chronic illnesses. Users say *Re-Mission* is as fun and challenging as popular commercial games. But it was designed to educate kids about cancer and its side effects and motivate them to stick with their treatments and

promptly report symptoms. "It's hard to fight a teenager when they won't take their medicine," says Janet Franklin, an oncologist and clinical director of the Leukemia Lymphoma Program at Childrens Hospital Los Angeles. "Video games draw teenagers in in a way we can't do with conferences and pamphlets."

Take Monzerratt Patino, 15, who has been playing *Re-Mission* since she was diagnosed with Hodgkin's lymphoma two years ago. "Before I played the game, I didn't really know how sick I could get if I didn't take my medicine," says Patino, who lives in Los Angeles. "The game explained how my white cells get affected by things and what happens to me," she says. "It was cool."

There is no clinical test for cool, but preliminary results from a yearlong study of 375 cancer patients ages 13 to 29 (including Patino) found that those who played *Re-Mission* opened their pill bottles 15

percent more often and had levels of chemotherapy drugs in their blood 20 percent higher than the nonplaying group. Players also said they had a greater sense of empowerment against their cancer. HopeLab distributes Re-Mission ([www.re-mission.net](http://www.re-mission.net)) free and wants to develop comparable resources for sickle cell disease, depression, and autism. Similar games are under development by others. The National Institutes of Health, for instance, has funded creation of games including Hungry Red Planet (\$11.95; [www.hungryredplanet.com](http://www.hungryredplanet.com)) and the forthcoming Escape From Diab, both aimed at preventing childhood obesity.

In a different twist on the video craze, there is Glucoboy, a blood glucose monitor that can be attached to a Nintendo Game Boy. The more a player regularly tests his or her glucose level—and it stays within an acceptable range—the greater the rewards like access to special games. The games are seeded with information on managing diabetes, including tips on diet, exercise, and monitoring blood sugar. Now awaiting Food and Drug Administration approval, Glucoboy was invented by a man whose son routinely hid his glucose meter to avoid the finger prick. “Diabetes is 90 percent self-management,” says Richard Bergental, an endocrinologist and executive director of the International Diabetes Center at Park Nicollet in St. Louis Park, Minn. “If video games can be crafted to reinforce or enhance self-management, that’s worth exploring.”

Ironically, one of the most promising uses for computer games, long demonized for fueling couch potatoism and childhood obesity, is fitness. Health messages are easy to embed in games, and the new generation of computer cameras such as Sony’s EyeToy, which projects the user’s image on the screen, prompts youngsters to work up a sweat. The fitness benefits of playing Dance Dance Revolution, the hugely popular interactive video game in which players repeat a dance sequence and compete against each other online, have been well documented. Now that concept is being taken further at places like XRtainment Zone, a budding chain of video-fitness centers where the games are simulated but the workouts, from throwing a baseball to running in place to riding a

bike, are real. The same concept is being used in rehabilitation, particularly for stroke victims, where the tedium of repeated motion exercises like reaching and bending often impedes progress.

Going the standard video game one step further is virtual reality, where users wear goggles and enter a computer-generated

body and his skin raw from graft sites on an additional 50 percent, Nathan, now 8 years old, got hysterical at the thought of his twice-daily treatments in the scrub tank, where his wounds were washed and dead skin removed. He was too young to safely be given enough narcotics to ease his pain. But when Nathan was playing Snow-

World, he was so completely transported that the nurses could lift his arms, stretch his skin, and clean him, sometimes without his noticing. “It was an ordeal every day,” says Neisinger. “That game was an answer to my prayers.”

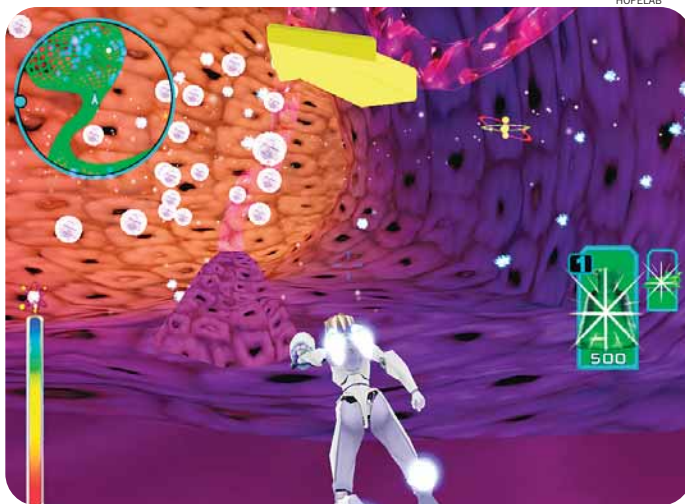
**Set the scene.** If SnowWorld is meant to ignore a painful reality, the virtual worlds created to treat PTSD and phobias, for example, do just the opposite. Exposure therapy has long been the accepted method of treating PTSD, but it has an unavoidable flaw: Victims must re-create their trauma.

“You never know exactly what they’re imagining,” says Rizzo, who has been using virtual reality to help soldiers returning from Iraq suffering from PTSD. “With VR we know what we’re introducing into the scene.”

Using a combat helmet equipped with VR goggles, a “base shaker” at foot level that vibrates to simulate riding in a hum-vee or tank, and a special machine to create smells such as burning gasoline, Rizzo can slowly return patients to combat. He can add, for example, familiar-looking buildings, the sounds of morning prayers, or a suspicious-looking merchant. He can also monitor a patient’s emotional state. “If it gets to be too much, we back them out,” says Rizzo, whose program is one of several being tested at military bases. VR is also being used to battle anxiety and phobias such as claustrophobia, which results in up to 20 percent of all MRIs being aborted midway by patients.

But VR can be expensive and has only recently begun undergoing the type of clinical testing that would make doctors and insurers take notice. The interactive headset for SnowWorld, for instance, runs about \$30,000. However, with more game makers and researchers focusing on video therapies, the cost and technology gap is expected to narrow.

It seems the perennially vilified video game may be on its way to a new reality: a hero of health and medicine. |



**FUN LESSON.** The Re-Mission video game helps Monzerratt Patino of Los Angeles learn about cancer diagnosis and treatment.

universe that is so distracting it can actually ease pain and anxiety. “Virtual environments are so all-consuming that the deeper someone is absorbed into the game, the less they can focus on their own pain,” says Hunter Hoffman, director of the Virtual Reality Analgesia Research Center at the University of Washington and the cocreator of SnowWorld, a virtual reality game for burn patients. SnowWorld takes players into an icy realm of penguins, igloos, and snowmen; users negotiate the terrain and engage in snowball fights. In a study now under review by the *Clinical Journal of Pain*, burn patients who played SnowWorld reported significantly lower levels of perceived pain during wound care: moderate or 5.1 on a scale of 10, compared with 7.2 or severe for those who did not play. A previous study found that the parts of the brain that register pain were less active while patients resided in the virtual world.

Heidi Neisinger didn’t need a study to convince her of the value of an alternate universe. In 2003, her son pulled a pot of boiling water onto himself and spent months in excruciating recovery at Harborview Burn Center in Seattle. With burns over more than 30 percent of his