

CyberTherapy & Rehabilitation

Issue 3 / 2011

The Official Voice of iACToR

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and much more...



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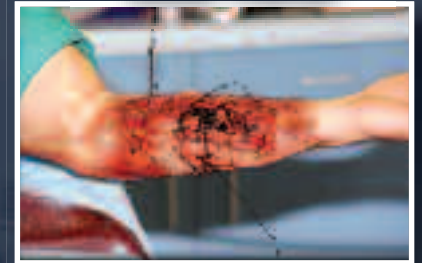
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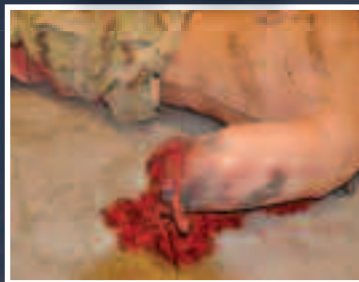
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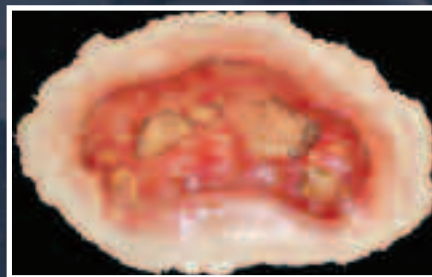
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Letter from the Secretary General and Editor-in-Chief

Professor Dr. Brenda K. Wiederhold

"While society has evolved and our life expectancy has increased, our stress system remains mired in old evolutionary patterns. Malfunction of the stress system may impair growth, development, behavior, and metabolism, leading to various acute and chronic disorders."

Dear Reader,

Most of you reading this editorial live in an affluent society. You probably have a desk job, which requires you to sit most of the day. You probably drive a car or take a train or bus to work rather than walk. You may have a long commute, which may tempt you to pick up fast food or convenience food rather than cook healthy meals. The resulting poor nutrition and lack of exercise can lead to obesity, high blood pressure, and a general lack of fitness. Obesity predisposes individuals to heart disease, diabetes, and some types of cancer.

Another factor contributing to so-called "diseases of affluence" is advances in medical care. Each generation has less exposure to infectious agents and pathogens and more exposure to antibiotics than the last, resulting in a lack of natural immunities. This can lead to diseases such as asthma, allergies, and autoimmune disorders.

Finally, and most germane to our readers, is the toll that stress makes us pay. Stress, combined with comparatively independent lifestyles and the absence of strong social bonds, may lead people to turn to alcohol, tobacco, or other drugs to self-soothe, and depression is common.

Increasingly, we are seeing these diseases of affluence not just in the affluent segments of societies, but in the poorest individuals of affluent countries. They live in neighborhoods that discourage walking and where fast food is plentiful and cheap. We are also seeing these diseases increase in countries experiencing rapid development, such as China and India. In China, the prevalence of obesity and hypertension almost doubled over the

period 1991 to 2004, and became less concentrated in urban areas. In India, estimated deaths from non-communicable diseases are projected to rise from 40% of all deaths in 1990 to 67% of all deaths by 2020.

A study of allergic rhinitis in Korea found a doubling of prevalence in the 10-year period between 1991 and 2001, noting that contributing factors might include exposure to indoor allergens including pet dander; outdoor air pollution; decreased consumption of fruits, vegetables, and fish; and a more sedentary lifestyle. A recent review concludes that while more data from intervention studies are needed, atopic diseases (hyperallergic reactions such as allergic rhinitis, asthma, and dermatitis) "appear, at least in part, to be the price paid for our relative freedom from infections and parasitic diseases in affluent societies."

I encourage our readers to pay special attention to the psychological costs of affluence. The proportionate share of the global burden of disease represented by psychiatric and neurologic conditions is pro-

"A recent study showed that psychological distress has been rising over time, and may be associated with being overweight. Half the British population view themselves as overweight, and happiness and mental health are worse among overweight people in both the UK and Germany."

jected to rise from 10.5% in 1990 to 14.7% in 2020. In some countries, even wealthy adults must still overcome the stigma associated with seeking help for mental health issues. Children in affluent families may manifest more substance abuse, anxiety, and depression.

Letter from the Secretary General

(continued from page 1)

A recent study showed that psychological distress has been rising over time, and may be associated with being overweight. Half the British population view themselves as overweight, and happiness and mental health are worse among overweight people in both the UK and Germany. For each 10-point rise in BMI, there is a drop in psychological health of 0.3 General Health Questionnaire points. The authors note that while suggestive, this does not establish causality.

Many disorders are associated with a dysfunction of the stress system: obesity, metabolic syndrome, and type 2 diabetes; hypertension; autoimmune disorders and allergies; anxiety, depression, and insomnia; and pain and fatigue syndromes. While society has evolved and our life expectancy has increased, our stress system remains mired in old evolutionary patterns. Mal-

function of the stress system may impair growth, development, behavior, and metabolism, leading

"I encourage our readers to pay special attention to the psychological costs of affluence ... Many disorders are associated with dysfunction of the stress system: obesity, metabolic syndrome, and type 2 diabetes; hypertension; autoimmune disorders and allergies; anxiety, depression, and insomnia; and pain and fatigue syndromes."

to various acute and chronic disorders. As researchers and clinicians engaged in cognitive rehabilitation, let us be mindful of the interrelationships among psychological and physical health as we work to combat these diseases of affluence.

Create your own reality!
Brenda Wiederhold

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International Association of
CyberPsychology, Training
& Rehabilitation



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iACToR is the official voice and resource for the international community using advanced technologies in therapy, training, education, prevention, and rehabilitation.

MISSION

Our mission is to bring together top researchers, policy makers, funders, decision makers and clinicians, pooling collective knowledge to improve the quality, affordability, and availability of existing healthcare.

Ultimately, through international collaboration with the most eminent experts in the field, we are working to overcome obstacles and increase access to top-quality healthcare for all citizens. By enhancing public awareness of the possibilities that technology offers, we move toward changing and improving healthcare as it currently exists.

MEMBERSHIP

As the only international association dedicated to CyberPsychology, Training & Rehabilitation, iACToR offers its members unique opportunities.

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Interreality in the Management
and Treatment of Stress-Related Disorders

INTERSTRESS
Is a European-funded project



The INTERSTRESS project aims to design, develop and test an advanced ICT-based solution for the assessment and treatment of psychological stress.

Objectives:

- Quantitative and objective assessment of symptoms using biosensors and behavioral analysis
- Decision support for treatment planning through data fusion and detection algorithms
- Provision of warnings and motivating feedback to improve compliance and long-term outcome

To reach these goals, INTERSTRESS will use a new e-Health concept: Interreality. What is Interreality? It is the integration of assessment and treatment within a hybrid, closed-loop empowering experience, bridging physical and virtual worlds into one seamless reality.

- Behavior in the physical world will influence the virtual world experience
- Behavior in the virtual world will influence the real world experience

These goals will be achieved through:

- 3D Shared Virtual World role-playing experiences in which users interact with one another
 - Immersive in the healthcare centre
 - Non-immersive in the home setting
- Bio and Activity Sensors (from the Real to the Virtual World)
 - Tracking of emotional/health/activity status of the user and influencing the individual's experience in the virtual world (aspect, activity, and access)
- Mobile Internet Appliances (from the Virtual to the Real world)
 - Social and individual user activity in the virtual world has a direct link with user's life through a mobile phone/PDA

Clinical use of Interreality is based on a closed-loop concept that involves the use of technology for assessing, adjusting and/or modulating the emotional regulation of the patient, his/her coping skills and appraisal of the environment based upon a comparison of the individual patient's behavioural and physiological responses with a training or performance criterion. The project will provide a proof of concept of the proposed system with clinical validation.

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Telemonitoring and Real-Time Evaluation of Data

A growing trend in patient-centric care is made user friendly by the use of mobile health devices, including applications for smartphones that wirelessly collect data from a number of self-monitoring devices. Here, a patient transmits his recently measured blood pressure data by bringing his Near Field Communication (NFC) enabled mobile phone close to the NFC enabled blood pressure device. This field brings together diverse companies and will see explosive growth in upcoming years.



VR for the Management of Obesity and Eating Disorders

Due to the sensitive nature of eating disorders, assessing real-life behaviors and choices can be unrealistic and tedious, but with the help of Virtual Reality researchers and therapists are now mimicking real situations in a clinical setting to assess actions and better diagnose cases of the debilitating disease.

Highlights of the

16th Annual CyberPsychology & CyberTherapy Conference

Gatineau, Canada
19-22 June, 2011



Cyberarium for Research Projects



Keynote Lecture:
Frank Biocca



Pre-conference Workshops on Advanced Topics



Interactive Exhibits



Group Lunches and Networking Breaks



Conference Coordinator
Genevieve Robillard



Awards Ceremony



Poster Sessions

Become Part of the iACToR Community at CYBER¹⁷ and Experience the Future Now!
12-15 September, 2012 - Brussels, Belgium - <http://www.interactivemediainstitute.com>

► By James Cullen

The 16th Annual CyberPsychology & CyberTherapy Conference: Evidence-Based Clinical Application of Information Technology (CYBER¹⁶), the official conference of the International Association of CyberPsychology, Training & Rehabilitation (iACToR) was held June 19-22, 2011 in Gatineau, Canada. Co-organized by Brenda K. Wiederhold, Ph.D., MBA, BCIA of the Interactive Media Institute and Stéphane Bouchard, Ph.D. of Université du Québec en Outaouais, CYBER¹⁶ was truly an international success setting directions for advancements in the growing disciplines of cyberpsychology, cybertherapy, training, and rehabilitation.

The quality and significance of the work presented at CYBER¹⁶ reaffirms that advanced technologies are increasingly playing a significant role in healthcare. CYBER¹⁶ further strengthened and advanced efforts to improve healthcare through technology, and explored ways to take advantage of remarkable transformations that are occurring.

CYBER¹⁶'s theme was twofold. First, it explored how technologies are currently being used as enabling tools. This included the use of advanced technologies such as Virtual Reality (VR) simulations, videogames, telehealth, videoconferencing, the Internet, robotics, brain-computer interfaces, wearable computing, and non-invasive physiological monitoring devices, in diagnosis, assessment, and prevention of mental and physical disorders. In addition, interactive media in training, education, rehabilitation, and therapeutic interventions were discussed. Second, the conference investigated the impact of how new technologies are being used to influence behavior and society. The conference also began its exploration into how social networking tools such as Twitter and Facebook are influencing individual behavior and personal relationships.

Under the direction of Workshop Chair Heidi Sveistrup, Ph.D., the conference kicked off with pre-conference workshops on Sunday, the 19th of June, which focused on multiple aspects of cybertherapy. Sunday concluded with a welcome reception at the Les Brasseurs du Temps, a traditional Canadian micro-brewery.

The conference officially began on Monday, the 20th of June, with welcome remarks from the Conference Co-Chairs, Professor Brenda K. Wiederhold and Professor Stéphane Bouchard. Monday's program included a rousing keynote address by guest speaker Frank Biocca, Ph.D. who spoke on Modulating Presence and Effectiveness in Virtual Health Environments, as well as a welcome from André Manseau, the Dean of Research at Université du Québec en Outaouais and Marc Bureau, mayor of Gatineau. Two parallel sessions in the morning and afternoon, followed by a large poster session made up the remainder of Monday at CYBER¹⁶. The poster session gave opportunities for developers and scientists to demonstrate their work and converse, one-on-one, with interested spectators and colleagues.

A busy Tuesday opened with a presentation by guest speakers Francis Fortin and Jean-Pierre Gray, Ph.D. regarding new trends in child pornography research and investigation. Six parallel sessions with topics including cybertherapy for anxiety disorders,

outcome trials for anxiety disorders, developing new tools and technologies, paradigms and phenomenology of cyberspaces, PTSD prevention and new treatment tools and applications of telehealth, made up the bulk of the day. An awards ceremony took place during lunch with three categories of awards given for outstanding achievements in CyberPsychology & CyberTherapy. Included in the award presentation was the 7th Annual CyberTherapy Lifetime Achievement Award, the Annual CRC-Clinical Cyberpsychology New Investigator Award, and four student poster awards sponsored by the Virtual Reality Medical Institute and Mary Ann Liebert, Inc. Tuesday's scientific program concluded with the 3rd Annual General Assembly of iACToR which was coordinated by Secretary General Brenda K. Wiederhold and led by reelected President Professor Giuseppe Riva. The General Assembly invited members from over 20 countries to convene to review relationships made with other associations, conferences and publications. The General Assembly then discussed how to bring about more rapid innovation in the advanced technologies and healthcare arenas. The conference concluded on Tuesday with a social dinner at the Casino du Lac Leamy.

From the full day of pre-conference workshops to the groundbreaking scientific program, CYBER¹⁶ continued its role as the leading conference in designing the future of cyberpsychology and healthcare. It is with sincere appreciation and gratitude that we thank the many that made this conference possible. This year's scientific committee co-chairs, Paul Emmelkamp, Ph.D., Wijnand IJsselstein, Ph.D. and Giuseppe Riva, Ph.D. were instrumental in providing one of the best scientific and social programs to date. The conference was also graciously sponsored by institutions and organizations whose important contributions allowed for a vibrant conference including Casino du Lac Leamy, the European Commission, Information Society and Media, Gouvernement du Québec, Interactive Media Institute, INTERSTRESS (EU-funded project), Istituto Auxologico Italiano, Mary Ann Liebert, Inc., National Institute on Drug Abuse, Université du Québec en Outaouais, Ville de Gatineau, Virtual Reality Medical Center, Virtual Reality Medical Institute, WorldViz and 3dVia. CYBER¹⁶ followed in the footsteps of many collaborative efforts that have allowed for the Annual CyberPsychology & CyberTherapy Conference to continue to shape the direction of the cyberpsychology discipline, a tradition which will continue at the 17th Annual CyberPsychology & CyberTherapy Conference (CYBER¹⁷).

CYBER¹⁷ will be held September 12-15, 2012 in Brussels, Belgium. The conference will continue to explore the uses of advanced technologies such as VR, videogames, telehealth, the Internet, robotics, brain-computer interfaces, wearable computing, mobile computing, social networking, and non-invasive physiological monitoring devices, in the diagnosis, assessment, and prevention of mental and physical disorders as well as assessment of interactive media in training, education, rehabilitation, and therapeutic interventions. Locating the conference in Brussels provides a unique opportunity to raise the visibility of these issues throughout the world and to allow CYBER¹⁷ to continue its storied legacy of organizing a truly international conference. Prominent academic representatives from Europe, North America, and Asia will serve as Scientific Chairs and on its Scientific Committee. Professor Brenda Wiederhold, who divides her time between the U.S. and Europe and serves as Secretary General of iACToR (<http://iactor.ning.com>), will serve as the conference's chief organizer and host.

News from iACToR Members

Organization grows worldwide as Special Interest Groups/Regional Chapters are established

As the official association of CyberTherapy & Rehabilitation, we will be bringing you updated news of various special interest groups and regional chapters of the International Association of CyberPsychology,

Training & Rehabilitation (iACToR) as they grow and expand throughout the year. As the organization becomes more well-established, it is further strengthened by growing numbers from around the globe. We

welcome iACToR members, as well as our readers, to submit content and updates, as well as suggestions for new groups. You can do so by reaching the Managing Editor at office@vrphobia.eu.

Mexican iACToR Chapter Information provided by Georgina Cardenas

A Mexican chapter of iACToR is being represented by the Virtual Teaching and Cyberpsychology Lab at the School of Psychology of the National Autonomous University of Mexico (UNAM), led by Prof. Georgina Cárdenas-López since 2001. The main purpose of this laboratory is to create a shared collection of participative knowledge for the incorporation of advanced technologies in the virtual teaching of psychology and psychotherapy interventions.

The laboratory conducts teaching and research projects focusing on the development of computer-based tutorials and virtual simulators to teach clinical practices in the treatment of anxiety disorders and family violence interventions. The current areas of research include evaluating an e-therapy program as a training scenario and conducting studies to determine its efficiency in Latino populations living abroad. The team's members also focus on conducting studies to understand the relevance of Virtual Reality (VR) cross-cultural validation as a dissemination strategy in the field and continue to develop virtual environments to treat social-

ly relevant problems in Mexico, such as criminal and family violence, obesity and addictions.

One of the principal objectives of the lab is to open new research lines devoted to technological development and applied research in psychology, focusing on solving and addressing psychological problems of high social relevance. This is the case for a project addressing Posttraumatic Stress Disorder in victims of criminal violence, including the treatment program for Complicated Grief and Depression in residents of Ciudad Juarez, among others. It is also an aim of the lab to collaborate with other groups and institutions from different countries, and to create collaborative interdisciplinary groups.

The lab is currently made up of 26 members including professors, researchers, graduates and undergraduate students that continue conducting research using advanced technologies and VR in a variety of fields, and are highly motivated in communicating with other scientists.

Stay abreast of new topics and technology by following or joining the group on <http://iactor.ning.com>.

Student Special Interest Group SIG Leader: Willem-Paul Brinkman

The International Association of CyberPsychology, Training & Rehabilitation's (iACToR) Student Special Interest Group (SIG) has recently become active in contributing to the CyberTherapy & Rehabilitation Magazine's Country Focus column, which features an in-depth look at mental healthcare in countries around the globe.

As part of their research, Ph.D. Students will have the opportunity to interview experts in the field, exploring ways in which advanced technologies are improving healthcare and learning more about the history and future of medicine and psychology in their native regions. The SIG group aims to foster interaction between established specialists and students by encouraging interaction and exchanging of information between the two groups.

iACToR's Student SIG supports fellow students with their research and education in this area. Our members are primarily students,

but membership is also open to other iACToR members that like to help students to become professionals.

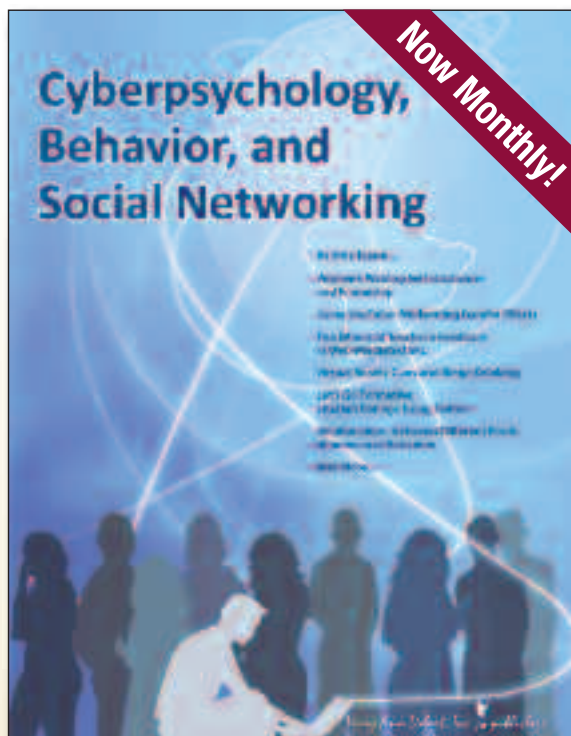
The group aims to connect students and encourages the exchange of information among members that are of interest to students, dealing with issues such as conducting research, publishing your work or developing a career in this area. Furthermore, the group also helps in bringing members in contact with the leaders of the community. It promotes the interests of students in general, and specifically in the association, and the events it organizes or endorses.

We encourage interested students to join the group. By joining, you will have access to online material relevant for students. You will also be able to develop your international network, and have an opportunity to interact with your peers.

Become a member today by joining the Student Special Interest Group on <http://iactor.ning.com>.



Join the iACToR community by visiting
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—Paul M.G. Emmelkamp, Academy Professor
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Reigning in the Shocking Rise in Metabolic Disorders

"Diabetes, just one of the many metabolic disorders common worldwide, demonstrates how crucial prevention is in trying to control the epidemic ... It was estimated that 6.4% of the world's adult population suffered from diabetes in 2010, and in the next twenty years that number is projected to almost double. Prevention and management facilitated through the use of remote monitors, wireless technology and cell phone apps will encourage people to take action in their own health."

► By Brenda K. Wiederhold, Christina Valenti & Mark D. Wiederhold

With drastically increasing numbers of people dying from diseases such as diabetes, obesity and heart disease, it has become evident that metabolic disorders are a field in need of a large amount of attention and research. The term metabolic disorder describes any condition that disrupts the metabolic process or causes it to malfunction in any way. While some of these conditions are hereditary, many metabolic disorders today are developed as a byproduct of lifestyle and could be, idealistically, prevented. In addition, metabolic disorders stem from a multitude of factors, rather than a single gene or mutation, increasing the chances of developing more than one medical condition. This domino effect of comorbidity, along with the growing number of people exhibiting symptoms characteristic of developing a metabolic disorder, called metabolic syndrome, is forcing healthcare providers to make prevention as well as treatment a main priority.

Diabetes, just one of the many metabolic disorders common worldwide, demonstrates how crucial prevention is in trying to control the epidemic. According to the International Diabetes Federation, it was estimated that 285 million people, or 6.4% of the world's adult population,

suffered from diabetes in 2010, and in the next twenty years that number is projected to almost double to 438 million. Diabetes too, is not just an issue affluent countries are encountering, where meals consist of sugary foods packed with simple carbohydrates, but is affecting developing nations as well; India and China are the current leaders with the highest number of people diagnosed with diabetes. People are also beginning to develop an impaired glucose tolerance (IGT), or elevated levels of glucose, greatly increasing the risk of developing diabetes as well as cardiovascular disease. In addition, with the vast majority of cases of diabetes being Type 2, efficient and cost-effective ways of preventing and controlling the disease are a must.

Patient-centric care, based on providing patients with easy and convenient ways to monitor their own condition, will not only encourage people to take a more active role in their health, but will also help reduce healthcare costs. Small wearable devices, like the CommanderFlex, monitor important information needed to manage conditions such as diabetes, high blood pressure and cholesterol, chronic obstructive pulmonary disease (COPD), chronic kidney disease, and renal disease, by monitoring nutritional intake and

physical activity. This information can then be wirelessly transmitted to healthcare providers. Also, a new form of mobile health is developing, as shown by the product created by Ford Motor Company and WellDoc, a company devoted to improving technology for managing chronic conditions. The two have recently teamed up to design the WellDoc DiabetesManager® System: an in-car system that helps manage diabetes by allowing the driver access to their medical information, like vitals and medications, as well as wireless capabilities from their car, bringing constant care to patients as they drive.

Countries and research labs throughout the world are also teaming up to test the large-scale efficacy of telemedicine services. Renewing Health, a collaboration between nine European regions and the European Commission, is a project consisting of real-life trials that will evaluate personalized telemonitoring services for the management of chronic disorders like diabetes, COPD, and cardiovascular diseases. Large-scale implementation of telemonitoring systems could help the overall management and prevention of chronic diseases, as well as alleviate the burden of healthcare costs by facilitating access to care from remote locations.

A staggering number of related applications for smartphones are being developed as well, efficiently utilizing a device users carry everyday and adopting it into one that monitors medical conditions on-the-go. The Austrian Institute of Technology has developed a system, DiabMemory, that utilizes Keep in Touch (KIT) technology allowing users to access health-related information from different monitoring devices, like a glucose monitor, through an application on their smartphone. Patient in your Pocket, designed for healthcare professionals and developed by the Computer Science Corporation (CSC), is a mobile application for BlackBerry smartphones and PlayBooks that sends updates on patients in real-time to the device, and allows the user to update information as well as schedule and keep track of appointments. These and similar apps, like the WaveSense Diabetes Manager App for the iPhone, iPad, and iTouch, are available for only a few dollars or even free. Using everyday devices like smartphones helps users take small steps to take control over their condition.

Since prevention for these diseases is key, education about the role that obesity and overeating play in developing metabolic and other chronic disorders has become the focus of many prevention programs. Weight loss pills and workout regimens are not lacking by any means, but no universal method has been developed that will ensure lasting results. Part of the reason why losing weight and keeping it off is so hard to achieve, and why there is no one way that guarantees success, is because the factors that lead to weight gain are different for every individual. Genetics, lifestyle, money, environment, and psychological health intersect in infinite ways, and all need to be considered when assessing one's condition. Personalized routines designed to fit each individual and thorough care are necessary to reducing one's weight, rather than a one-size-fits-all workout or diet plan. In addition, obesity is more than just a physical condition; it is now being considered a psychological one as well. Biological science can tell us about the metabolic processes that contribute to weight gain, but psychologists have found that it can be a mental concern, as much as a biological one, when trying to devise methods of prevention and treatment, and modifying behavior is powered by the mind.

Cognitive behavioral therapy (CBT), which has been proven effective for treating sub-

stance abuse addictions and other psychological issues like anxiety, depression, and phobias, is now being applied to obesity by changing behavior gradually and modifying attitudes towards food and eating. The idea behind CBT for weight loss is that one's eating habits are learned, and therefore can be re-taught through small shifts

“Small wearable devices monitor important information needed to manage conditions such as diabetes, high blood pressure and cholesterol, chronic obstructive pulmonary disease chronic kidney disease, and renal disease, by monitoring nutritional intake and physical activity.”

in one's behavior that increase as progress is made. CBT programs start with an assessment by a physician of a patient's overall condition and lifestyle, from medical history to daily routine, as well as the individual's environment, to determine what factors trigger overeating. From there, gradual goals are set for the patient that are altered as therapy progresses increasing the likelihood of long-term sustainability, whereas drastic cuts in diet and rigorous exercise can be unhealthy and harder to maintain over extended periods of time. Support from healthcare professionals, as well as the people that surround an individual, is also emphasized in CBT, and patients are encouraged to join support groups. Mobile and wireless communications like IM and video chat also make support more accessible, further increasing chances of success.

Virtual Reality (VR) is being used in conjunction with CBT in an effort to modify behavior in a setting that reflects reality, yet one that is private. VR is increasingly being used in cases where psychological causes, for example, eating disorders like binge eating and purging, are associated with weight gain, body dysmorphia, and negative perceptions of self. VR works well alongside CBT because it too can easily be designed to fit the specific needs of a patient. By immersing patients in a life-like setting, VR aims to identify what cues contribute to one's habits, help the patient identify how the cues make him or her feel, and then, with the help of a healthcare professional, develop self-efficacy by finding ways to overcome the triggers and negative emotions associated with them. New strategies are devised throughout the

process to discover the best solution for the patient, and gradual modifications are made to one's activity and diet. What gives VR its edge, though, is that it is done in a non-threatening environment, where the patient can cope with their issues away from public scrutiny. Despite initial start-up investment, using VR in the short-term

to produce long-term effects will outweigh the cost of a lifetime of suffering from a debilitating condition.

Prevention and management facilitated through the use of remote monitors, wireless technology and cell phone apps will encourage people to take action in their own health. In addition, CBT and VR therapy target the roots of harmful habits that inevitably cause people to develop life changing medical conditions. With the success of many current mainstream methods of treatment faltering, hope for rehabilitation lies in the development of new convenient telemonitoring devices and within the confines of virtual worlds. Together these innovations could bring people who suffer from metabolic and chronic disorders all over the world the relief they've been waiting for.

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DiabMemory – mHealth for Diabetes Patients Based on Keep In Touch Technology

Chronic conditions, such as metabolic disorders including diabetes, call for long-term adherence to treatment on the patient's behalf. "mHealth" works to address this need and "is being more and more commonly used to encompass these ideas of patient-centered, prevention-oriented, and decentralized health management and treatment of chronic conditions using mobile and wireless communication technologies."

► By Günter Schreier & Peter Kastner

The management of patients with chronic diseases in general and diabetes mellitus, in particular, requires a dedicated infrastructure to support patients and doctors in communication and intensive collaboration, without the need for frequent face-to-face meetings. Pervasive health-care is a term that draws on mobile communication devices and the Internet as well as concepts like ubiquitous computing and ambient intelligence. The term "mHealth" is being more and more commonly used to encompass these ideas of patient-centered, prevention-oriented, and decentralized health management and treatment of chronic conditions using mobile and wireless communication technologies.

During the last decade the eHealth & Ambient Assisted Living team of the Austrian Institute of Technology (AIT) has developed and evaluated a variety of mHealth solutions for people with chronic conditions, among them patients with:

1. Metabolic diseases (diabetes, obesity)
2. Cardiovascular diseases (chronic heart failure, hypertension, pulmonary arterial hypertension)
3. Dermatological diseases (psoriasis)

and, in general, also for elderly people that need assistive technologies, e.g., to improve medication compliance.

About a year ago we started with a proof-of-concept tele-diabetes project in collaboration with the Austrian Insurance Institution for Railways and Mining Industry. In the course of this project diabetes patients are equipped with a mobile phone-based telemedicine system based on the Keep In Touch (KIT) technology. KIT is a concept for intuitive human computer interfacing that uses smart objects and wireless technologies like Near Field Communication



Figure 1: A patient transmits his recently measured blood pressure values simply by bringing his Near Field Communication (NFC) enabled mobile phone close to the NFC enabled blood pressure device (UA 767 plus NFC, A&D Company, Tokyo, Japan).



Figure 2: Keep In Touch (KIT) provides for intuitive and seamless acquisition of various kinds of monitoring data just by touching icons and sensor devices with a Near Field Communication (NFC) enabled mobile phone.

(NFC) and Radio Frequency Identification (RFID). KIT enables people to collect information from health-related items of their daily life by simply touching those things with their NFC-enabled mobile phones.

Patients are equipped with NFC-enabled mobile phones with a pre-installed diabetes application and a varying set of medical measurement devices (glucose meter, blood pressure device, weight scales), depending on their disease conditions (type 1 or type 2 diabetes mellitus, type of therapy and medication). A dedicated mHealth service platform provides for mobile phone and Web-based access for patients and doctors and features a diabetes specific electronic patient record, communication via E-mail and Short Message Service (SMS), data storage and processing, and trend curve visualization, as well as support for device management and logistics. The whole system is designated "DiabMemory."

The project will be subject to an extensive evaluation program. Among the issues to be assessed are various measures of patient compliance. Since May 2010, more than 250 patients have been enrolled in the program. Initial results indicate that most patients stay in the program and do send a high percentage of the measurements as compared to the predefined recording and transmission schedule. This indicates that the concept is well accepted by the patients.

Currently, physicians use the dedicated Web accessible system using their individual credentials. In the future, we will provide them with a more direct access to the system by linking the DiabMemory system to the upcoming Austrian national electronic health record system.

DiabMemory, i.e., the combination of the KIT-based user interface and the underlying Closed Loop Healthcare

services, is a step towards pervasive healthcare that allows to not only bridge barriers with respect to space ("anywhere") and time ("anytime") but also with respect to "anything." All relevant items that are important for a given monitoring scenario like sensors (e.g., medical measurement devices) and actuators (e.g., medication blisters and dispensers) become "smart objects" and thus can be a part of the pervasive health and care infrastructure that supports patients and elderly people with various chronic conditions ("anyone").

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Next-generation Obesity Prevention and Treatment Research

“The application of Virtual Reality (VR) tools for obesity prevention and treatment research is still relatively rare. Our goal in the Immersive Virtual Environment Testing Area is to build a collection of VR research scenarios that will enable us to investigate new questions related to genomic applications for weight management and obesity prevention as they emerge in step with scientific advancement.”

► By Susan Persky

Scientific discovery in the field of genomics is accelerating and will increase understanding of how genetic makeup together with behavioral factors contributes to obesity and its co-morbidities. However, determining how to optimally incorporate this new knowledge into medicine and public health to prevent and treat obesity will be a considerable challenge in coming decades. Currently, we know very little about how patients and health care providers will respond to genomic information and the impact it will have on their decisions and behavior. To ensure effective translation, researchers need to evaluate possible impacts of genomic knowledge ahead of its application. Our research group in the Social and Behavioral Research Branch of the National Human Genome Research Institute uses immersive Virtual Reality (VR) research tools to do exactly that.

In our Immersive Virtual Environment Testing Area, we explore these anticipated situations through VR-enabled research. My collaborators and I attempt to identify optimal ways of integrating

genomic information into clinical encounters with patients who are overweight or obese. We aim to discover ways that this information can promote positive social outcomes, for example, reducing stigmatization of patients based on their weight. At the same time, we also investigate if and how genomic information can promote healthy dietary and physical activity behavior.

To explore these issues, we developed a basic VR-based clinical encounter simulation. Using this tool, my collaborator Dr. Collette Eccleston and I investigated how providing information about genetic underpinnings of obesity to medical students effected patient care and treatment. Because the patient in the study was virtual, we could manipulate whether she appeared to be obese or not while holding all other variables constant. The virtual patient told medical students about her symptoms and concerns, and medical students were asked to advise and make decisions about the patient's care while we tracked their responses and behaviors. This research demonstrated that pro-

viding information about the genetic underpinnings of obesity as part of a clinical encounter with an obese patient reduced the extent to which medical students stereotyped and avoided eye contact with that patient. At the same time, however, it also reduced the rates at which they recommended health behavior and weight management consultation as part of her care. The latter outcome raised concerns that dissemination of genomic knowledge could undercut efforts to engage patients in health-promoting behaviors.

In current work, my collaborators and I examine the effect of physician-provided genetic information on patients who are overweight. In the virtual clinic, patients encounter a physician who administers weight counseling information while using different communication approaches. In this way, we can investigate whether these communication approaches might mitigate negative social or behavioral consequences or amplify positive consequences of providing patients with genetic obesity risk information.

Figures 1, 2: Screen shots from the Immersive Virtual Environment Testing Area featuring the clinical encounter simulation (below) and VR model of a buffet restaurant (right).



"In the virtual clinic ... we can investigate whether these communication approaches might mitigate negative social or behavioral consequences or amplify positive consequences of providing patients with genetic obesity risk information."

We initially chose to employ VR methods for this research as opposed to more traditional ones (e.g., hypothetical vignettes, standardized patient or clinician actors) for a few important reasons. In the VR clinic our participants can directly experience and respond to situations that are forecast to occur in the future, but are not yet a reality. At the same time, we can study aspects of the scenario (e.g., the type of genomic information introduced, the communication approach of the clinician) in a manner that

is standardized between participants. We also use VR to embed measures of behavior, like a clinician's level of eye contact with a virtual patient, in the research context.

Moving beyond the clinical context, we have also developed immersive VR environments that serve as stand-alone behavioral measures. We recently created a VR model of a buffet restaurant for an ongoing study in collaboration with Dr. Colleen McBride. The study investigates

how the provision of genomic information about a young child's obesity risk affects mothers' food choices for that child. In the virtual restaurant mothers fill a plate with various foods. We measure calorie content of the food choices to provide a rigorous behavioral outcome. Although the VR restaurant currently lacks some sensory modalities (e.g., smell), it does offer practical benefits and allows sensitive measurement of mothers' engagement with the food (e.g., food choice order).

The application of VR tools for obesity prevention and treatment research is still relatively rare. Our goal in the Immersive Virtual Environment Testing Area is to build a collection of VR research scenarios that will enable us to investigate new questions related to genomic applications for weight management and obesity prevention as they emerge in step with scientific advancement.

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A New Approach to the Management of Metabolic Syndrome: A Telemedicine Initiative

eHealth Initiatives Can Improve Access to Healthcare in Remote Areas

"The eHealth revolution is upon us. Technology has penetrated every aspect of healthcare at an unprecedented rate, from an organizational and administrative level to the front-line delivery of services. It is simultaneously enhancing the quality of healthcare provided and reducing costs; thus it comes as no surprise that eHealth is working its way up the political agenda, both nationally and internationally."

► By Christopher R. Jones, Ricardo B. Cardoso & Thais Russomano

Metabolic syndrome describes a collection of risk factors that are primarily associated with the development of diabetes and coronary artery disease, but have also been implicated in non-alcoholic fatty liver, stroke and certain cancers. Chronic non-communicable diseases such as these are responsible for 60% of global deaths and cardiovascular diseases are leading the way. The morbidity and mortality attributable to these conditions are enormous and highlight the need for expeditious management and risk factor prevention. Worryingly, the number of people displaying features of the metabolic syndrome is increasing all over the world. Specifically, 25% of the adult population in Europe and the Americas are thought to meet the syndrome's criteria.

Most patients with metabolic syndrome can be adequately managed within primary care, where the family physician will address each component individually in order to prevent future problems. However, there will be some complicated cas-

es that require specialist input, such as evaluation by a cardiologist or an endocrinologist, in order to prevent or treat complications. A recent overhaul of the Brazilian health system has improved primary care access to a level that would previously have been unimaginable and the consequent progress in public health is encouraging. Nevertheless, problems still remain – Brazil is a country of continental proportions that experiences significant social and health inequalities and access to specialist care is poor outside of big cities. This provides the perfect arena within which eHealth can flourish.

The eHealth revolution is upon us. Technology has penetrated every aspect of healthcare at an unprecedented rate, from an organizational and administrative level to the front-line delivery of services. It is simultaneously enhancing the quality of healthcare provided and reducing costs; thus it comes as no surprise that eHealth is working its way up the political agenda, both nationally and internationally.

At Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS) we have organized several successful telemedicine projects over the last five years. The focus has been

"One of the key barriers to the adoption of Internet-based telemedicine initiatives in many countries is a lack of bandwidth; some remote areas do not enjoy any Internet coverage. On the other hand, the mobile network is present almost universally."

on specialist second opinion delivery in remote areas of Brazil covering dermatology, cardiology, odontology, ophthalmology and pharmacology. In July 2010, we conducted a multidisciplinary eHealth assistance project in a remote region of the Brazilian Amazon in collaboration with the State University of Amazonas (Figure 1). Through this project we were able to provide rural Brazilians with access to secondary care without them having to leave their communities. There were many patients with features of metabolic syndrome, some of whom were not being managed optimally. Recommendations were made for future management that will hopefully help to prevent the development of serious complications.



An underlying theme of our work in Brazil has been to provide people living in remote areas with access to specialist care via telemedicine that they may otherwise not receive (Figure 2). Although Brazil has good access to primary care, the area of medicine that traditional-



ly caters to the components of metabolic syndrome, many countries in the world do not. Rural healthcare in such countries

One of the key barriers to the adoption of Internet-based telemedicine initiatives in many countries is a lack of bandwidth;

“Brazil is a country of continental proportions that experiences significant social and health inequalities and access to specialist care is poor outside of big cities. This provides the perfect arena within which eHealth can flourish.”

is delivered by non-medically trained community health workers. Our model could be used by community health workers to interact with physicians and optimize management of patients. Furthermore, it provides a reliable source of information for those community health workers wishing to further their knowledge. We believe that our multidisciplinary eHealth model could potentially be adapted and applied in any setting around the world with access to an Internet connection.

some remote areas do not enjoy any Internet coverage. On the other hand, the mobile network is present almost universally. Mobile device technologies (e.g., mobile phone, PDA) for healthcare, or “mHealth,” have been used in many different contexts. Not only are they relatively cheaper, network coverage is also more extensive and reliable than the Internet. Furthermore, more than 75% of the world’s population use a mobile phone. They have been used for ongoing medical education, communi-

Figure 1 (above): A community in a remote region of the Brazilian Amazon that participated in the eHealth project.

Figure 2 (left): A summary of the process followed within our project.

ty and clinical data collection, real-time monitoring of vital signs and second opinion delivery using transmitted images. In more affluent countries iPhones have become commonplace within hospitals.

The potential of eHealth is encouraging and will undoubtedly offer effective solutions for some of the current inefficiencies in healthcare delivery in many regions of the world. It is of the utmost importance, however, that any initiative is carefully considered to ensure that it is culturally and contextually appropriate. Any intervention should be designed based on the specific area within which it will operate. A one-size-fits-all approach will inevitably fail.

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Smartphones in Diabetes Care and Management

"Today, one can easily find hundreds of diabetes-related apps (smartphone applications) ... The potential of many of these apps in reducing healthcare costs and improving clinical outcomes is huge."

► By Maged N. Kamel Boulos

Smartphones are increasingly being used as handheld computers rather than mere phones due to their powerful on-board computing capability, capacious memories, large color screens, and open operating systems that encourage application development. A Morgan Stanley presentation published in 2010 is predicting that mobile Web access via smartphones and other small form factor Internet devices, such as the iPad and clones of small touch-screen tablets, will overtake conventional desktop Internet use by 2015. Smartphones are rapidly and radically transforming healthcare, enabling it to become more mobile at the point of need and more participatory by engaging all involved stakeholders, including patients, non-clinical caregivers, the general public, clinicians and various organizations. The role that smartphones can play in the care of patients with a long-term condition such as diabetes has been the subject of many published papers in the peer reviewed research literature ever since the early days of smartphone precursors, the basic mobile phones, with limited monochrome screens and basic Short Message Service (SMS) and Wireless Access Protocol (WAP) Web access capabilities, which were featured in research projects such as the European-funded M2DM-Multi-Access Services for telematic Management of Diabetes Mellitus project (2000-2002). Today, one can easily find hundreds of diabetes-related apps (smartphone applications) in the different smartphone app stores for the major smartphone platforms that are currently available, namely the iPhone, Android and Blackberry, Nokia Ovi and Windows Phone 7 (Figure 1). The potential of many of these apps in reducing healthcare costs and improving clinical outcomes is huge.

WaveSense Diabetes Manager App

One of the most popular smartphone apps for diabetes care and management is the WaveSense Diabetes Manager, a free iPhone app from AgaMatrix. The app can track a diabetic user's glucose results, carbohydrate intake, and insulin doses. The WaveSense Diabetes Manager helps the user quickly enter his/her information, review the data with convenient color-coded



Figure 1: The colorful icons of some diabetes-related apps available for Windows Phone 7 in the Windows Phone Marketplace.

ed charts and graphs (Figure 2), and gain a new perspective on his/her diabetes management. The user is also able to watch educational videos from within the app to learn about healthy eating, lifestyle choices, and hear from others who are living with diabetes. Second opinion is "one E-mail away," as the app offers an option to E-mail results to the user's trusted healthcare team. The main functions and features of the app include:

- Glucose results recording by time of day (logbook);
- Carbohydrate/insulin data recording, in addition to blood glucose results (carb/insulin tracking);
- The user can put his/her glucose results in context by adding tags about food, exercise, medicine, or health issues (tagging);



Figure 2: The blood glucose Trend Chart function in WaveSense Diabetes Manager. The horizontal axis represents time; the vertical axis represents glucose level in mg/dL. A white dot indicates that the reading is equal to or within the user-defined hypoglycemic and hyperglycemic limits, while a pink dot indicates that the reading is below the user-defined hypoglycemic limit, while a yellow dot indicates that the reading is above the user-defined hyperglycemic limit. The light blue band indicates the target range for pre-meal low and post-meal high readings that are set by the user. The white vertical centerline indicates the reading of that point that is being displayed in the reading bar (in this example: 100 mg/dL on 17 July 2010 at 6:26 AM). A highlighted point has a gray circle around it. The time range button on the reading bar can be used to change the zoom-level of the graph; zoom options are 1, 7, 14, 30 and 90 days.

- A visual representation of users' glucose results over time (trend chart - Figure 2);
- Color-coded results enabling the user to easily spot when he/she goes into high or low ranges;
- The app is fully customizable, allowing users to set custom target ranges, hypo/hyperglycemic limits, and mealtime schedules;
- Educational video content courtesy of dLife (<http://www.dlife.com/>); and
- A function to E-mail diabetes information to the user's family and trusted healthcare team for review (E-mail reports). The user has full control over what gets sent, to whom, and when.

Connecting a Glucometer to the iPhone

Besides manual data entry by the user (which might be perceived as a bit tedious and might pose some long-term patient compliance issues), Agamatrix has produced and tested a "WaveSense Direct Connect Cable" to enable automatic blood glucose data uploading to the WaveSense Diabetes Manager app running on the iPhone. The Direct Connect

Cable connects a WaveSense Jazz meter/blood glucose monitoring system to the iPhone, making it the first medical device to connect directly to Apple's iOS platform, which includes the iPhone, iPad and iPod. FDA 510(k) approval of the Direct Connect Cable is still pending as of May 2011.

Another closely related device that can also connect to the WaveSense Diabetes Manager app and automatically upload data to it, is the recently announced (September 2010) ultra-compact "iBGStar Plug-In Glucose Meter for the iPhone," co-developed by AgaMatrix and Sanofi-aventis. Like the WaveSense Direct Connect Cable, the iBGStar Plug-In Glucose Meter is not yet available on the market as of May 2011.

Which Smartphone Platform?

The WaveSense Diabetes Manager app only runs on the iPhone platform. Porting apps to other platforms such as Windows Phone 7 and Android is not a trivial task and can prove costly for app developers. Cross-platform coding is currently most successful for mobile Web apps (apps that run in smartphone Web browsers and/or are using Java for Mobile Devices, and are thus generally smartphone-platform-neutral), which can partly solve this developer's "platform dilemma." However, Web apps can sometimes prove a bit restrictive (in what they can be coded to do) compared to the functionalities that can be implemented in native apps (apps designed for a spe-

cific smartphone operating system and CPU—Central Processing Unit). A good example of a diabetes-related Web app for all smartphone platforms is Handy-Logs Sugar. Nevertheless, a Web app can still do many things and with the emerging cross-platform app creation services such as Conduit Mobile, the task of creating such apps is becoming much easier than ever before.

A Glimpse into the Future of Smartphones

While smartphones are already "light years ahead" of conventional desktop computers in terms of mobility, the coming years are expected to carry further innovations in this respect, with smartphones becoming even more mobile, lighter, thinner, and, hopefully, smarter with the help of technologies such as cloud (server-side) computing. Technophile readers unable to wait and eager to see this happen can have a glimpse into what the next generations of smartphones might look like by watching the thin-film, flexible "paper-phone" prototype video and photos at <http://tinyurl.com/3pvapxs>.

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Virtual Reality in the Assessment and Treatment of Eating Disorders

“The exact cause of eating disorders is unknown. Genetic, psychological, trauma, family, society, or cultural factors may play a role. In this context, Virtual Reality offers different opportunities for the assessment of eating disorders ... [Furthermore], different groups are trying to enhance traditional cognitive behavioral therapy with the use of a virtual environment.”

► By Giuseppe Riva

The recent convergence between technology and medicine is offering new methods and tools for behavioral healthcare. Between them, an emerging trend is the use of Virtual Reality (VR) to improve the existing cognitive behavioral protocols for different psychological disorders, including the assessment and treatment of eating disorders.

The exact cause of eating disorders is unknown. Genetic, psychological, trauma, family, society, or cultural factors may play a role. In this context, VR offers different opportunities for the assessment of eating disorders. A first approach was proposed by the Spanish research group led by Gutiérrez-Maldonado. This group investigated the effect on body satisfaction – a key feature of eating disorders – produced by food-related VR experiences involving subjects with eating disorders. In a recent study, 85 female patients with eating disorders and 108 students were exposed to four virtual environments: a kitchen with high-calorie food, a kitchen with low-calorie food, a restaurant with

high-calorie food, and a restaurant with low-calorie food. Results demonstrated that participants with eating disorders had significantly higher levels of body-image distortion and body dissatisfaction after eating high-calorie food than after eating low-calorie food, while control participants reported a similar body image in all situations.

In a different study a group of researchers headed by Alessandra Gorini recently tested whether virtual stimuli were as effective as real stimuli, and more effective than photographs in the anxiety induction process in these patients. Specifically, the study tested the emotional reactions, assessed using both psychological and physiological criteria, to real food, VR food (see Figure 1) and photographs of food in two samples of patients affected, respectively, by anorexia and bulimia nervosa compared to a group of healthy subjects. Real and VR food both induced a comparable emotional reaction in patients, higher than the one elicited by the photos. Instead, no differences were found in the healthy subjects.

In summary, both studies suggest the potential of VR as an experiential assessment tool: only patients reported psychological and physiological changes after the exposure to VR food. This suggests the possible use of VR exposure as a screening tool in cases of suspected eating disorders.

Distorted body image, negative emotions, difficulty in maintaining long-term positive outcomes and lack of faith in the therapy are typical problems of eating disorder patients. To target these issues, different groups are trying to enhance traditional cognitive behavioral therapy (CBT) with the use of a virtual environment.

The first approach is offered by Experiential Cognitive Therapy (ECT). Developed by Giuseppe Riva and his group inside the VREPAR and VEPSY Updated European funded projects, it is a relatively short-term, patient-oriented approach that focuses on individual discovery and proprioceptive changes. Alongside CBT, ECT shares the use of a combination of cognitive and behav-

ioral procedures to help the patient identify and change maintaining mechanisms. However, it is different due to the inclusion of ten VR sessions. All the virtual scenes, included in a free virtual environment, NeuroVR, can be downloaded for free from the NeuroVR Web site, <http://www.neurovr.org>, and can be customized by the therapist adding significant cues (images, objects, and video) related to the story of the patient (see Figure 2).

This approach has been tested in various controlled studies. The first involved 20 women with Binge Eating Disorders who were seeking residential treatment. The sample was randomly assigned to ECT or to CBT based nutritional therapy. Both groups were prescribed a 1,200-calorie per day diet and minimal physical activity. Analyses revealed that although both groups were binge free at one-month follow-up, ECT was significantly better at increasing body satisfaction, self-efficacy and motivation to change.

In a second study, the same randomized approach was used with a sample of 36 women with Binge Eating Disorders obtaining similar results.

A second approach was investigated by the Spanish research group led by Cristina Botella. The group led by Botella compared the effectiveness of VR to traditional CBT for body image improvement in a controlled study with a clinical population. Specifically, they developed six different virtual environments, including a 3-D figure whose body parts (arms, thighs, legs, breasts, stomach, buttocks, etc.) could be enlarged or diminished and placed in different contexts (for instance, in the kitchen, before eating, after eating, facing attractive persons, etc.).

In a trial 18 outpatients, who had been diagnosed as suffering from eating disorders (anorexia nervosa or bulimia nervosa), were randomly assigned to one of the two treatment conditions: the VR condition (CBT plus VR) and the standard body image treatment condition (CBT plus relaxation). Patients treated with the VR component showed a significantly greater improvement in general psychopathology, eating disorders psychopathology, and specific body image variables. Furthermore, these results were maintained at one-year follow-up.

In conclusion, the present results en-

courage the use of VR in clinical (exposure therapy) and even non-clinical (task learning) settings in which a highly customizable and controllable simulation is preferred to a real-life experience.

Moreover, these results provide evidence of the potential of VR in a variety of experimental, training and clinical contexts, its range of possibilities being extremely wide and customizable. In particular, in a therapeutic perspective based on a cognitive behavioral approach, the use of VR instead of real stimuli facilitates the provision of very specific contexts to help patients to cope with their conditions. Finally, the results indicate that even a relatively cheap (less than 3000 €/4000 US\$) PC-based platform using a VR software like NeuroVR can be used to screen, evaluate, and treat these patients.

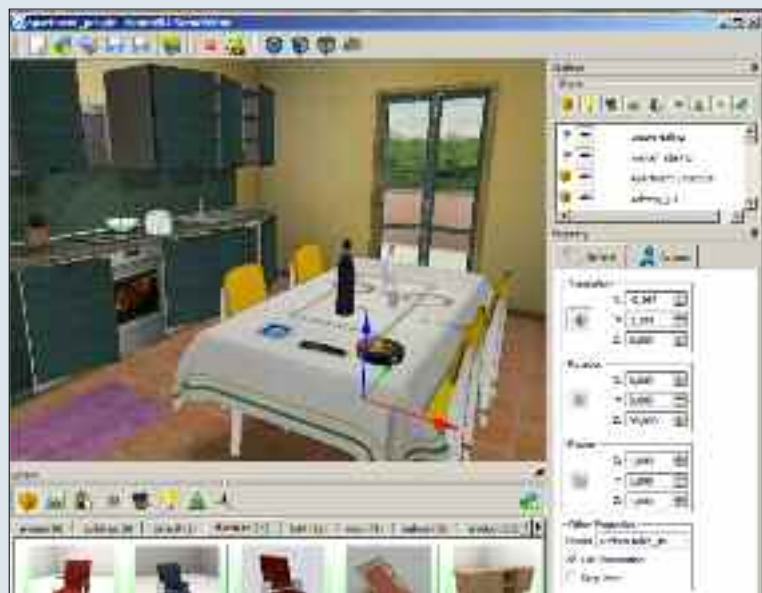
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Figure 1 (below): NeuroVR's virtual environment has a limitless number of virtual scenes which can be customized by the therapist.

Figure 2 (right): Exposure to food in virtual worlds can be used to measure the emotional reaction of subjects, allowing for results to aid in diagnosing eating disorders.



The Burden of Metabolic Diseases

The global vision of health systems in the world is

changing. Developed countries have to address the epidemic of chronic diseases due to aging populations and developing countries have to bridge the gap for the modernization of their social and healthcare systems. In this demanding perspective healthcare providers, public health and social services agencies are called to deliver higher quality care to more patients and citizens at a lower cost. Several complex factors have to be faced and modern, sustainable healthcare systems require a comprehensive reassessment.

Examples of how new technologies and patient-centered care can address the challenge of a sustainable healthcare system

► By Alberto Lazzeri & Maria Romano

As recently reported by the World Health Organization's World Health Statistics 2011 that analyzed the health status of 193 countries by measuring over 100 health indicators, chronic non-communicable diseases, such as heart diseases, diabetes and tumors, account for almost two-thirds of global deaths and for 70-80% of healthcare spending.

Metabolic diseases, rising in Western countries as well as in the rest of the world, are a well-known risk factor for cardiovascular diseases and neoplasms. The high prevalence, high incidence, chronicity and long-term implications for health and healthcare costs make diabetes a major concern for the European Union (EU) and the U.S. In particular, diabetes has more than tripled in the U.S. – from 5.6 million to 19.7 million – from 1980 to 2009. However, a major portion of the numerical increase in diabetes is predicted to occur in working-age and older adults in developing countries causing an increasingly large clinical and financial charge in the future. A recent International Diabetes Federation (IDF) report presented the following scenario: a 98% increase, from 12.1 to 23.9 million sufferers, in Africa; a 94% increase, from 26.6 to 51.7 million, in the Middle East

and North Africa; a 72% increase, from 58.7 to 101.0 million, in South-East Asia; a 65% increase, from 18.0 to 29.6 million, in South and Central-America. Therefore, by 2030, the vast majority of individuals with diabetes will reside in developing countries.

Such an increase in chronicity, associated with population aging, will challenge health service organizations regarding demand of both economic and human resources. This will occur as a countertrend to the short and medium term expected reduction of physicians and health personnel, and of economic resources contingency. A change in how the health and social care system responds to future needs is therefore strongly and quickly required and envisaged.

In this challenging panorama, new e-Health tools and systems promise great improvements in efficiency and encourage new perspectives to address the burden of metabolic and chronic diseases.

Four key action areas have been identified:

- Prevention to reduce the incidence and progression of the disease and its

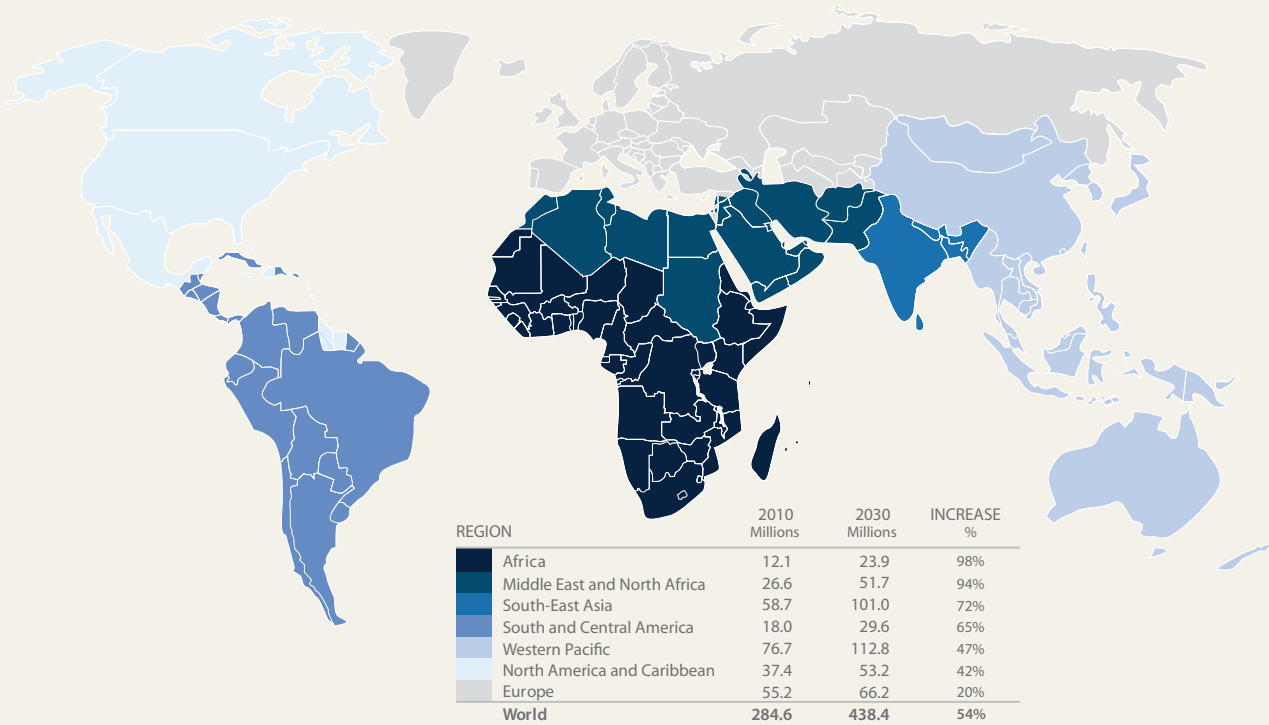
associated complications and co-morbidities.

- Early detection and early treatment, which can improve health outcomes.
- Integration and continuity of prevention and care.
- Monitoring and self-management.

Diet, obesity, and lack of physical activity are contributing factors in contracting a metabolic disease. Change in lifestyle has crucial effects in prevention through a correct understanding of the disease including risk factors and co-morbidities. Diabetes often goes undiagnosed because many of its symptoms seem so harmless. New instruments like an educational portal, diabetes risk test, and interactive educational games can increase people's sensitivity to the problem and lead to early detection of diabetes symptoms and consequently, to early diagnosis and treatment.

Innovative chronic care management programs emphasize the patient's central role in self-managing their own healthcare, but including it in a wider strategy of integrated

IDF Regions and global projections for the number of people with diabetes (20-79 years), 2010-2030



IDF Diabetes Atlas, 4th ed. © International Diabetes Federation, 2009

disease management that, with the support of technology, allows effective care coordination.

Four principal orientations towards diabetes and its management were identified: resisters, identity resisters, consequence accepters, identity accepters, and consequence resisters and accepters. Therefore, people with diabetes have varying orientation and preferences towards forms of both education and self-management which have been identified and should be taken into account. Diabetics should take an active role in their care plan, in a sort of therapeutic complicity as a personalized alliance between the patient and the diabetes care team. The care plan should include a program of diabetes self-management education (DSME), which guarantees, through the use of different strategies and techniques, appropriate education on how to solve problems connected with the management of the disease. The self-monitoring of blood glucose (SMBG), shared with the diabetes team, is an indispensable component of the management of diabetes.

Recent exciting research foresees applications in Virtual Reality (VR) technologies (human interaction with computer-simulated environments) having a possible impact on healthcare even greater than that offered by the new communication technologies, broadening its use to the management of patients affected by metabolic diseases. VR was first developed and applied to surgical procedures (robotics, technical training, treatment from remote sites), and was subsequently extended to the fields of rehabilitation (cerebrovascular and Parkinson's disease) and psychology (substance abuse disorders and behavioral medicine). Some investigators have recently qualitatively evaluated how interactive games can promote behavior change in prevention, treatment indication and self-management for people newly diagnosed with type 2 diabetes. Other researchers evaluated the efficacy of "alternative reality" games in promoting healthy eating and exercise using sensors dedicated to measuring heart rate and other devices. Finally, VR is expected to induce sustainable behavior change implementing therapeutic guid-

ance on the optimal diet and physical activity for weight control, and adherence to therapy linking visual and other sensory aspects of food and exercise with the patient's cognitive and emotional states.

The scientific community's support for the use of VR technologies in the education of metabolic patients is rising, as testified by the grant's call recently published by the National Institute of Health. The potential areas for hypothesis-testing and developmental research are expanding, and hopefully leading, in the near future, to new methods and technologies.

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Product Comparison Chart: Metabolic Disorders

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PRODUCT / DISEASE	DESCRIPTION OF PRODUCT	MANUFACTURER
Patient In Your Pocket for chronic and long term disease management	a mobile application for BlackBerry smartphones and PlayBooks that sends patient details to healthcare providers in real-time, providing accurate and up-to-date information and improved quality of care	Computer Science Corporation (CSC)
Raisin Personal Monitor for chronic heart failure and diabetes management	wireless health device taken in the form of a pill, remotely transmits information on heart rate, physical activity, body position, patient-logged events, and ingested drugs, via Bluetooth to be recorded and analyzed on any computerized device, providing real-time physiologic data	Proteus Biomedical
WellDoc DiabetesManager® System for Type 2 Diabetes	FDA-approved project utilizing Ford's SYNC® voice-activated in-car mobile connectivity system – allows patients to verbally enter medical information into the system within their vehicle to help manage their condition; healthcare providers also have access to this information via cell phone, in-office computers, or in their own car	Ford Motor Company and WellDoc
AiperMotion for weight loss for Type 2 Diabetes, prediabetes, and metabolic syndrome patients	small rectangular device worn on a belt, monitors calorie intake, activity, and nutrition which is entered into the device and compiled in a nutrition log that then calculates an energy balance; can easily be transferred to a PC for analysis by healthcare providers	Aipermon
Metabolic Syndrome US-EU for metabolic disorders	application that assesses users risk for developing metabolic syndrome by analyzing waist circumference, blood pressure, HDL cholesterol, fasting glucose and triglyceride levels	Minoru Oishi
COMMANDER FLEX for heart failure, hypertension, COPD, diabetes, chronic kidney disease, end stage renal disease	modular device with LCD graphic display equipped with integrated blood pressure and heart rate sensing – can measure an array of vital signs; using Bluetooth® Wireless Technology and two-way messaging, patients and healthcare providers can be updated and communicate quickly, and in a portable way, to manage medical conditions	CARDIOCOM
WaveSense Diabetes Manager App for diabetes management	free Apple touch app that measures carbohydrate intake, glucose and insulin levels and allows the user to record additional information like diet, exercise, and medication; analyzes results over time with easy to read graphs and includes integrated E-mailing of data	AgaMatrix
www.kilocoach.at for weight management	online lifestyle management platform includes database of nutritional data, practical analysis of diet and daily activities and logs data facilitating remote interaction with experts; personalized program recommended for each user	Kilo Coach™
DiabMemory for diabetes management	diabetes telemonitoring system consisting of Near Field Communication equipped mobile phones with diabetes management applications and medical measurement devices, stores data and facilitates long-distance communication between healthcare providers and patients through E-mails and texts	Gesundheitsdialog

Wounds of War IV: Pain Syndromes: From Recruitment to Returning Troops

EDITED BY:

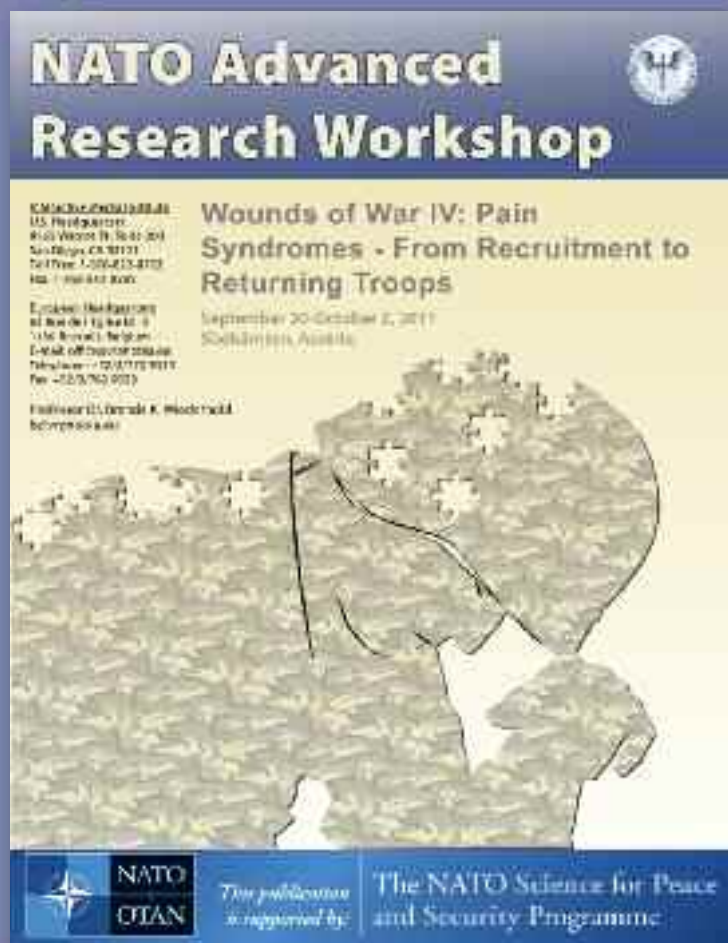
Professor Dr. Brenda K. Wiederhold, Ph.D., MBA, BCIA

WOUNDS OF WAR IV: PAIN SYNDROMES – FROM RECRUITMENT TO RETURNING TROOPS

On September 30-October 2, 2011 the NATO Advanced Research "Wounds of War IV: Pain Syndromes – From Recruitment to Returning Troops" will draw over 25 eminent experts from 11 countries to discuss the topic of increased Pain Syndromes in our service men and women.

To be held in Südkärnten, Austria at the Hotel Amerika-Holzer, discussion topics will include increased Pain Syndromes as a result of missions, as well as how Pain Syndromes may be prevented. Research has shown that those who have served in both combat missions and peacekeeping operations are at an increased risk for Pain Syndromes. The ultimate aim of the workshop will be critical assessment of existing knowledge and identification of directions for future actions. The co-organizers of the workshop alongside Professor Brenda K. Wiederhold include Professor Kresimir Cosic, Professor Mark D. Wiederhold and Colonel Carl Castro.

Full papers will be published with IOS Press
TO ORDER: cybertherapy@vrphobia.com



The post-conference book will reflect the key topics discussed in the four sections at the workshop:

First Session

Vulnerability to Pain Syndromes

Second Session

Diagnosis and Assessment of Pain Syndromes

Third Session

Treatment of Pain Syndromes

Fourth Session

Clinical Updates on Pain Syndromes

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Wireless Technology Based Tele-Homecare Systems

“Tele-homecare is a key solution for chronic patient care. One of the main aims of tele-homecare is to provide quality healthcare for patients, especially elderly patients, through advanced technology. The main areas to apply tele-homecare in chronic patient care are diabetes, heart disease and chronic obstructive pulmonary diseases.”

► By Ali Hakan Işık & İnan Güler

Chronic diseases are long lasting or repetitively occurring diseases that are the leading cause of mortality and disability throughout the world. For instance, chronic diseases account for approximately 80% of deaths in some countries. These diseases include a wide range of health problems which cause negative side effects on a patient's life. It is important to de-

“It is important to develop an assessment and management plan with multidimensional and multidisciplinary perspectives in order to provide sustainable treatment for chronic patient care.”

velop an assessment and management plan with multidimensional and multidisciplinary perspectives in order to provide sustainable treatment for chronic patient care.

Chronic patient care requires more effort but patients are not always compliant. In this context, tele-homecare is a key solution for chronic patient care. One of the main aims of tele-homecare is to provide quality healthcare for patients, especially elderly patients, through advanced technology. The main areas to apply tele-homecare in chronic patient care are diabetes, heart disease and chronic obstructive pulmonary diseases.



Figure 1: Bluetooth-enabled pulse oximeter.

Information and communication technologies help to improve the quality and features of tele-homecare. For instance, a mobile device can connect and gather physiological data from ECG, spirometry and pulse oximeter devices, etc. By using wireless technology such as Bluetooth tech-

nology, no wires need to be attached to the patient's body. In this way, the patient is not disturbed and ease of use is improved. As shown in Figure 1, the patient can measure his or her own oxygen saturation and heart rate with a Bluetooth enabled pulse oximeter. In most cases, these data are converted into XML type and transmitted to remote locations by means of a mobile device. In remote locations, all physiological data are stored in a database. These data are evaluated to help aid in decision-making. During the decision-making process, generally, rule-based and heuristic algorithms such as an artificial neural network, a vector support machine is used. When the patient's physiological data extracted from the decision support system shows the patient's condition is worsening, an emergency Short Message Service (SMS) is sent. Conversion of the evaluated data result to the SMS XML template is performed on a Web server that is located in a remote location.

In addition, many different kinds of software designed to run on a mobile device have emerged. This easy-to-use mobile assessment tool allows data to be collected daily and facilitates pro-



Figure 2: Web-based tracking of pulmonary function test (PFT) results.

database. This page provides access to all the patient's data, so doctors can follow their patients and send an E-mail or Web-based SMS related to the

Tele-homecare systems also provide a significant improvement in reducing the numbers of visits to the doctor's office, an important figure for health expenditure in the field of chronic patient care. It is believed that tele-homecare provides effective self control and remote management of chronic patients.

This work was supported by Gazi University scientific research project (BAP-07/2010-55).

"Information and communication technologies help to improve the quality and features of tele-homecare. For instance, a mobile device can connect and gather physiological data from ECG, spirometry and pulse oximeter devices, etc."

longed assessment over time. It also requires less effort. Another important component of tele-homecare is Web-based monitoring of physiological data. As shown in Figure 2, data from a patient's acceptable pulmonary function test (PFT) result performed at the patient's home are sent to a remote

evaluation of the disease. In this way, statistical data about the development of the disease is easily obtained; as a result, chronic pulmonary patients are more informed and aware concerning their disease, and their quality of life is increased. Lastly, the costs of treatment are reduced.

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FDA Denies Safety Approval for Anticipated Anti-Obesity Drugs

Since the fen-phen scare of the '90s, consumers have been urged to be wary of diet and weight loss pills, but that hasn't slowed the demand for a quick-fix solution to America's biggest health concern. Since the much-anticipated obesity drugs were recently struck down by the FDA, the question remains: will a "magic pill" be found, and more importantly, are drugs really the best solution to an overwhelming epidemic?

► By Emily Butcher

The FDA's advisory committee has a recent history of exercising unusually high safety standards for new pharmaceuticals aimed at treating obesity, but that didn't prevent the shock many expressed that the three most promising drugs poised to hit the market, backed by Arena Pharmaceuticals, Vivus, and Orexigen Therapeutics, were not approved due to insufficient data presented on effectiveness, as well as potential risks shown by the detection of tumors found in rats who had received high doses of one of the drugs. The pharmaceutical industry has yet to find an effective weight loss drug and has run into a list of complications and setbacks, including the infamous fen-phen scare of the '90s; weight loss drugs have been blamed for side effects ranging from damage to heart valves to depression and suicidal thoughts. This is not entirely surprising since the brain-body link is arguably one of the reasons it can seem nearly impossible to shed pounds; many prospective drugs have negatively affected hormones and neurotransmitters associated with cognition, information processing, and emotions.

Despite these upsets, the implementation of an effective weight-loss drug could not only generate billions in revenue, but also save a staggering amount in healthcare costs each year – a study

conducted partly by the federal Centers for Disease Control and Prevention estimated that treating obesity and obesity-related diseases totaled nearly \$147 billion in 2006 in the U.S., accounting for 9% of overall healthcare spending. Once considered strictly a Western, affluent affliction, the ripple effects of the disease are quickly spreading to countries like Japan, India and Brazil. Besides the potential lucrative gains, increased quality of life could affect a large percentage of the global population who now struggles with the effects of being overweight or obese.

Despite millions of potential users, obesity drugs are rarely covered by insurance companies, and doctors are often hesitant to prescribe them, stressing that diet and exercise are the most effective long-term solution to maintaining a healthy weight. Furthermore, experts point out that some non-obese users may choose to buy the drug, finding a quick fix to drop those last five pounds. To combat these fears, the companies emphasize that their products are not meant for cosmetic purposes, but aim to control and prevent diseases such as diabetes, cardiovascular disease and high blood pressure, among other related conditions.

Undoubtedly, pharmaceutical companies will continue to push forward with new

medicines and work to tackle existing problems, but the decision may ultimately lead to heightened support for alternate therapies, such as the increasingly supported theory that any effective form of weight loss management includes at least some form of behavior modification. Weight Watchers, aimed at maintaining long-term behavioral changes, was found to be the only effective weight-loss program of eight popular programs evaluated by the *Annals of Internal Medicine* in 2005.

These landmark decisions will likely foster support for a combination of approaches and treatment. The FDA seems to favor bridging the gap, and asked Arena Pharmaceuticals to submit more information on studies using the drug in combination with behavioral health modifications. So for now, the search for the "magic pill" continues and for the time being, some old-fashioned sweat may prove to be the most effective treatment.

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Factors Affecting Patients' Preferences of Telemedicine: Design of Diabetes Management Care

"Attempts to introduce telemedicine in South Korea during the past 20 years have been largely unsuccessful due to various reasons ... As regulatory issues and technological limitations are overcome through the Korean government's efforts and technology advancement, establishing a sustainable revenue model and designing a service that attracts patients have become important factors for the successful implementation of telemedicine."

► By Hayoung Park, YuCheong Chon & Kun-Ho Yoon

Telemedicine is the conversion technology which is expected to improve quality of care while improving the efficiency of the delivery of care, and the management of chronic conditions with the technology is of particular interest as the size of the aged population increases rapidly (Figures 1 and 2). However, attempts to introduce telemedicine in South Korea during the past 20 years have been largely unsuccessful due to various reasons: regulations designed for traditional medicine, immature technology, physician reluctance to change, and lack of patient willingness to pay for and adapt to the new mode of care. As regulatory issues and technological limitations are overcome through the Korean government's efforts and technology advancement, establishing a sustainable revenue model and designing a service that attracts patients have become important factors for the successful implementation of telemedicine. Patients' willingness to pay has a particular significance in South Korea since national health insurance coverage allows patients easy access to special-

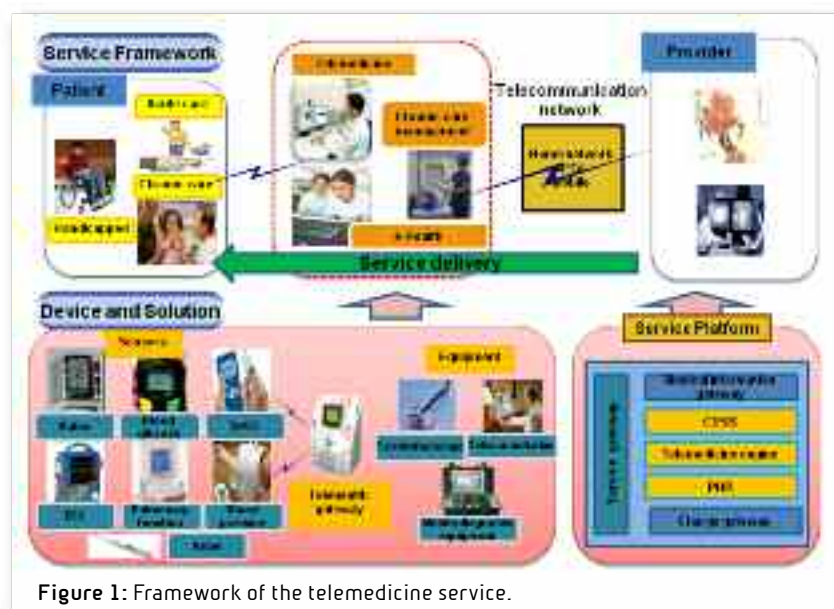
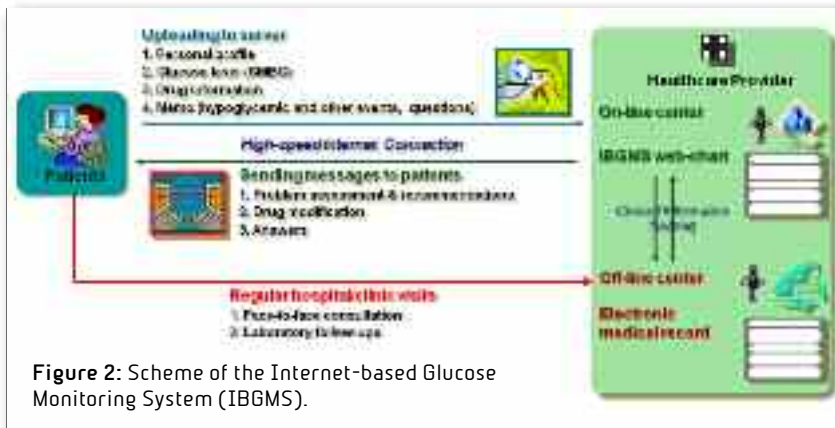


Figure 1: Framework of the telemedicine service.

ty care in clinics and hospitals, although patients' waiting time is long and consultations with doctors are insufficient in large teaching hospitals preferred by patients.

In a conjoint survey conducted through face-to-face interviews, we asked patients residing in the Seoul metropolitan area who visited medical school affiliated ter-



tiary care hospitals and clinics for diabetes care about their preferences among telemedicine service alternatives where the alternatives differed in price and nine attributes derived from dimensions of service quality: type of service provider, service scope, personalization of consultation, service hour, reply time, assurance of service, type of telecommunication platform, system reliability, and level of confidentiality assurance. We analyzed a total of 118 responses with the rank-ordered logit model based on the random utility model to find the patients' value and preferences for each attribute of telemedicine service for diabetes management.

We found that all 10 attributes of diabetes management care using telemedicine significantly affected patients' valuations and preferences. Price was the most important attribute for patients in choosing a telemedicine service alternative. The next most important attributes were: the comprehensiveness of service scope that includes care for other complicating and comorbid conditions and consultations for diet and exercise as well as glucose control, the availability of mobile phone-based service delivery, general hospital-based providers, and assurance of services. We found that patients were less concerned about the reply time and information security than the other attributes. Although patients were most concerned about price, they were willing to pay a monthly fee of over \$10 USD to attain the service attributes they value such as the comprehensiveness of service scope, mobile-phone based service,

and general hospital-based provider. We also found that demographic and disease characteristics made a difference in patients' valuations and preferences for the

"Although patients were most concerned about price, they were willing to pay a monthly fee of over \$10 USD to attain the service attributes they value such as the comprehensiveness of service scope, mobile-phone based service, and general hospital-based provider."

attributes. Females were more sensitive to assurance than males; older respondents were more accepting of office-hour only service than younger respondents; and respondents with higher education preferred Internet-based service more than others. Patients with complications or comorbidities cared more about general hospital-based providers for the assurance of care quality and mobile-phone based services for easier access to care than other respondents did.

We draw four implications from the study findings for the formulation of an adoption policy and the design of services using telemedicine. First, potential beneficiaries of the technology were most concerned about price among the service attributes studied, and the government or insurer may need to consider covering services with evidence of cost-effectiveness of the service. Second, the very feature of the technology – indirect delivery of care through telecommuni-

cation devices – strengthened the importance of the quality domain of service assurance, and service developers may need to institute a mechanism in their service design that ensures patients' trust. Third, it appeared that the levels of confidentiality and system reliability threshold of 1-5% failure were acceptable to patients although information safety and confidentiality have been indicated as obstacles in the adoption of information and communications technology (ICT) in healthcare, and researchers may need to quantitatively study patient preferences and concerns to attain knowledge that can guide the design of services. Lastly, patients' demographic and disease characteristics influenced their preferences, and policy makers and service developers may need to approach dif-

ferent patient groups with different strategies tailored to their needs and preferences.

Author Notes: The article is based on the study published in Telemedicine and e-Health: Park H, Chon Y, Lee J, Choi I, Yoon K. Service design attributes affecting diabetic patient preferences of telemedicine in South Korea. Telemedicine and e-Health 2011;17:442-451.

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Weight Loss Via the Internet:

How advanced technologies can contribute to improved lifestyle

“Conventional in-person weight loss programs can be powerful tools, but due to availability, inconvenience and costs, these programs cannot offer access to the masses ... the Web has emerged as a promising way to offer self-help options for non-medical weight loss treatments through conventional PCs, tablet PCs and smartphones that are cost-effective, save time, and are easily integrated into everyday life.”

► By Luzia Valentini

Cardiovascular diseases, such as stroke and myocardial infarct, are the main cause of death in the Western World. In Europe they account for 42% of all deaths in the total population. Prevention, delay in onset and reversal of cardiovascular diseases, therefore, can benefit a large segment of the population and the health system in general. Obesity due to poor nutrition and low physical activity is the main underlying cause for cardiovascular diseases. Effective, low-cost and broadly available tools to reduce weight by improving lifestyle are thus dearly wanted.

Conventional in-person weight loss programs can be powerful tools, but due to availability, inconvenience and costs, these programs cannot offer access to the masses. As over 75% of Americans and Europeans have Internet access, the Web has emerged as a promising way to offer self-help options for non-medical weight loss treatments through conventional PCs, tablet PCs and smartphones that are cost-effective, save time, and are easily integrated into everyday life. Electronic approaches can offer the flexibility needed to handle individual nutrition-

al approaches to self-reliantly empower humans to very specifically improve their dietary intake.

First Generation of Simple Weight Loss Platforms

Typical features of first generation self-help platforms are made up of static informa-

platforms provide mainly static information with minimal interaction.

Commercial weight loss Web sites are widespread, and most of them belong to the first generation category; the effectiveness of very few of these platforms has been validated. Previous investigations showed that under study conditions

“Obesity due to poor nutrition and low physical activity is the main underlying cause for cardiovascular diseases. Effective, low-cost and broadly available tools to reduce weight by improving lifestyle are thus dearly wanted.”

tion like weight loss information, information on physical activity, recipes, menu planners, caloric information on food items, diaries for recording food consumption (without automatic calculation of energy intake), bulletin boards to offer support, shopping lists of healthy foods, motivational tips, exercise expenditure counters, portion size charts, and dining out guides. The

first generation platforms produce at best half the weight loss achieved with a structured face-to-face weight loss program. These results are promising but not enough to be recognized as serious intervention tools by health professionals. The same evaluations revealed that dynamic self-monitoring “feedback factors” like visual display of goal progress,

immediate evaluation of eating behaviors and physiological calculators are pivotal for effectiveness. Motivators are also important.

Second Generation of More Sophisticated and Technically Advanced Platforms

The second generation of weight loss Web sites are highly interactive and provide in-

about to test its efficacy in a prospective clinical trial. We expect to receive results above the 5% weight loss achieved with previous weight loss platforms.

One key feedback and teaching tool of this platform is the immediate analysis of dietary intake taking into account the amount of physical activity (not only sports, but also physical activity integrat-

Such high quality platforms require immense investments in comprehensive food and nutrient databases. Currently, the database of this respective platform contains over 30,000 food items, and is updated daily. This database allows users to quickly find exact food products by name so that entering a full food diary averages only 10 minutes a day and is very precise. The platform is well accepted on the market and is currently used daily by 2,000-3,000 subscribers; if proven effective, the program may be a starting point for future weight loss platforms.

In summary, the Internet offers unique opportunities for weight loss interventions paralleled with general improvements in lifestyle habits. Future public Internet interventions will utilize high-quality, dynam-



Figures: Adopting healthy lifestyle habits has been shown to be positively influenced by the use of new online weight loss programs. *Photos provided courtesy of KiloCoach e.U.*



formation beyond the potential of in-person face-to-face support, such as immediate analysis of food intake.

Our working group started with a first generation platform. After evaluating the feedback of our study participants, we screened the German speaking online weight loss programs and identified one platform, KiloCoachTM (www.kilocoach.at), that was distinctively different from the other platforms. This platform was more interactive and highly resembled the vision of our study participants for future platforms. We started to incorporate this platform in our research and are now

ed into everyday life) needed to achieve the target energy intake needed to lose 0.5 kg of weight a week. This means that dietary intake must be precisely entered by users who are not nutritional professionals, and an immediate feedback has to be provided to the user, otherwise he cannot counteract (through physical activity) a possible excess of caloric intake within an appropriate time interval. By familiarizing themselves in detail with their own dietary habits, individuals automatically learn the nutritional facts of the food products they consume, become confident judging portion sizes and evaluating the adequacy of their nutritional intake.

ic Web sites with a high volume of automatic feedback. Such platforms, however, are work intensive and require scientifically sound specifications. This poses a large responsibility to the platform provider. Future models to use such platforms can comprise pure self-help techniques and cooperation with primary physicians.

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Addressing the Global Rise in Eating Disorders

“Eating disorders affect five times as many people as does schizophrenia and twice the number of people affected by Alzheimer’s disease, yet are appropriated a fraction of the media attention and funding by the government ... Promising new technologies, including cognitive behavioral therapy aided by the use of Virtual Reality, have led researchers and healthcare providers to explore treatment options in previously unexplored fields.”

► By Allison Ines

Eating disorders (EDs) have been proven to affect the global population of women while discussions of these disorders remain taboo in most countries. Despite being one of the top contributors to premature deaths of all mental disorders, the nature of EDs and the urgency to find better treatments remain mysterious to many. EDs affect five times as many people as does schizophrenia and twice the number of people affected by Alzheimer’s disease, yet are appropriated a fraction of the media attention and funding by the government. EDs, such as anorexia nervosa, bulimia nervosa, binge eating disorder, and eating disorder not otherwise specified (EDNOS), are shockingly prevalent and the highest rates are found in the U.S. However, there is a rapid emergence of EDs among women in industrialized countries such as Italy, Brazil, and Japan; EDs affect nearly 69 million women worldwide.

The media in the U.S. has fostered a feminine culture centralized around the pursuit to be thin. Girls are at a vulnerable age when they are initially exposed to this ideal and are ultimately influenced by the importance the media has attributed to weight loss, fad diets, and counting calories. In fact, the earliest onset age in the U.S. for an ED is 12 years old, while negative self-images among girls emerge as

early as eight years old. Nearly 1% of women in America are anorexic; up to 4.1% suffer from bulimia; 3.5% of women are diagnosed with binge eating disorder; and anywhere from 5%-13% of women have EDNOS, a category of EDs that does not meet the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) criteria for any specific ED. Four percent of anorexics, 3.9% of bulimics, and 5.2% of those with EDNOS (including binge eating disorder) die from their disorders. Suicides account for 0.6%, 0.9% and 0.5% of those deaths, respectively.

The thriving fashion industry present in Italy plays a huge role in the rise of EDs amongst Italian women. Until recently, no one larger than a size 0 graced the runways in Italy during fashion week and a number of brand name designers believe that the addition of healthier-looking, full-bodied models imposes limits on their creativity as artists. There are about three million reported cases of EDs among women in Italy – 0.8% of women are anorexic; 1.7% are bulimic; and 8% suffer from EDNOS. Immersed in a culture that has a reputable love for food and an admiration of high fashion, Italian women may feel trapped between the choice to eat plenty and the choice to remain skinny and fashionable, all while fearing and

dealing with the criticisms of an Italian family.

Brazilian women are also at high risk of developing an ED. Growing up in a society that praises a Westernized version of “beautiful,” women living in Brazil are pressured to fit into the sexy, exotic, Brazilian, supermodel prototype. In a study performed among girls 7-14 years of age in Southeast Brazil, “at-risk” individuals did not differ from their controls in body mass index (BMI) but were of higher social economic status, suggesting that there is a stronger preference for thinness among more Westernized social groups. With a television set in almost every household, everyone in this country, from the poor to the rich, are exposed to the trend to be skinny.

Similarly, the rise of EDs in Japan is linked with the media as well as with their traditional gender roles. Girls are taught at the beginning of their education the separation between male and female roles, and that womanhood is achieved through motherhood. These women commonly aren’t given an intermediate stage between childhood and motherhood, nor are they taught the life skills to mature as a female outside this particular framework. This impaired devel-

opment leaves women prone to the belief that not eating is a less embarrassing way of “opting out” of an unhappy marriage and coping with their “failures” as a woman in Japanese society. Because of this, as well as the pursuit of thinness present in more industrialized areas in the country, 10% of Japanese women in their 20s, 16% of women in their 30s, and 18% of female students report a BMI of less than 18.5 kg/m², which is very close to the diagnostic weight threshold for anorexia.

On the other end of the spectrum lies obesity, a medical condition affecting 300 million women worldwide. With 35.5% of American women, 44.0% of Saudi Arabian women, and 39.5% of Egyptian women suffering from obesity, the highest numbers of affected populations, obesity affects high- and low-income countries alike. Obesity can lead to other comorbid medical conditions,

such as a number of cardiovascular diseases; musculoskeletal disorders such as osteoarthritis; and some cancers such as endometrial, breast, and colon cancer.

Due to various sociocultural backgrounds and differing biological makeup of sufferers, it is evident that there are countless factors that can lead to an ED. No two patients with an ED are driven to their condition in the exact same way – as a result, a single, one-size-fits-all treatment plan has been deemed insufficient. Treatment must be handled by a therapist on a one-on-one basis to assess the diverse psychological states experienced by each individual. One option utilizes a proven effective treatment method, cognitive behavioral therapy, creating individualized treatment plans aiming to address the root causes of EDs. An evaluation of patients’ attitudes towards food and eating are made, and goals are achieved in a step-by-step fashion which

is helpful in the long-run for preventing relapse.

The undeniable rise in EDs calls for proactive treatment and further attention, as well as increased funding. Promising new technologies, including cognitive behavioral therapy aided by the use of Virtual Reality, have led researchers and health-care providers to explore treatment options in previously unexplored fields. Changing cultural ideals and gender roles, as well as improving education on the subject for young girls, can also help to combat this growing global epidemic.

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¹ IDATE, 2010. "Serious Games: A 10 billion euro market in 2015" report.
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Health Coaching and Life-Long Monitoring for Persons with Type 2 Diabetes – The Telemedicine Value Proposition

Although “Telemedicine services can make healthcare more accessible to people, and can be a useful tool in providing diabetes care and diabetes self-management,” the authors point to the fact that a lack of related studies and evidence is still hindering the widespread adoption of Telemedicine. To solve the problem, nine European regions have joined together in a large-scale project aiming to validate and evaluate telehealth services for the management of major chronic diseases.

► By Lis Ribu et al.

The world population has become vulnerable to lifestyle diseases such as Type 2 diabetes. Although new and more efficacious diabetes medications and improved medication delivery systems have been developed, the majority of people with diabetes do not achieve optimal metabolic control, leading to poor health outcomes. Telemedicine services can make healthcare more accessible to people, and can be a useful tool in providing diabetes care and diabetes self-management. Studies, however, are still needed to examine the impact of this technology on patients.

In order to deal with the lack of solid evidence nine European regions, supported by their national governments and with co-funding from the European Commission, have joined forces in the Renewing Health project (www.renewinghealth.eu). The project will implement real-life large-scale trials – and recruit about 8,000 patients – to validate and evaluate telehealth services for major chronic diseases including diabetes during 2011 and 2012. It covers 20 pilot programs organized into nine “clusters,” each of them covering a homogeneous type of telehealth service.

The validation and evaluation process is being conducted in the form of a randomized controlled parallel-group unblinded trial. Potential participants are selected by screening electronic healthcare records in

the municipality and hospital databases. Randomization is performed separately for each country by specialized departments or research organizations. The objective is to evaluate whether the intro-





duction of large-scale personalized and technology supported telemonitoring and health coaching intervention (in some trials only) produces benefits in terms of clinical outcome, health-related quality of life, health status and empowerment of these patients in managing their health conditions. In addition, all the trials in Renewing Health evaluate the economic and organizational impact of the new services, and examine their acceptability by patients and health professionals.

Six of the 20 trials covered by Renewing Health are dedicated to diabetes. They have been organized into two "clusters," because of differences in the type of intervention foreseen in the various pilots.

The aim in Cluster 2 "Life-long monitoring" of patients with diabetes is to evaluate whether patients with diabetes mellitus can be followed by simplified, centralized and large-scale telemonitoring of blood glucose levels and blood pressure. It will also assess whether this intervention produces health and economic benefits when introduced without major changes to the existing care process of a large provider of primary healthcare services (Berlin, Germany) or a secondary care center (Trikala, Central Greece).

Cluster 1 – "medium-term health coaching and lifelong monitoring" – is made

up of four pilot sites. In *Norrbottnen, Sweden*, participants receive PCs with dedicated software that manages the collection and transmission of their diagnostic measurements. Measurements are performed on a regular basis by the participants, and equipment will be installed in participant's homes. The participants can review all their measurements in a graphical display. The telemedicine application will be integrated with the local Health Information System.

The intervention in *South Karelia, Finland*, consists of regular measurements of physiological and health parameters. Participants receive equipment and a mobile phone with specific software for manual and/or automatic reporting of data to a central server. Measurements are taken regularly on a personalized basis, and are entered in personal health records via a Web application. In addition, the self-management server will send participants feedback and reminders on the basis of the reported health parameters and in compliance with the self-management plan.

In *Northern Norway* the patients will receive a smart phone with a diabetes diary application (the "Few-Touch Application"), a self-help tool that consists of five main elements that are accessible to the user (food habits registration, blood glu-

cose data management system, physical activity registration, personal goals setting and general information). Patients are requested to self-monitor their blood glucose levels, eating behavior and physical activities on a daily basis, but at intervals that they feel are beneficial and manageable. While blood glucose data is automatically transferred to the phone from the blood glucose meter, activity data and food habits have to be manually entered by the user.

In *Carinthia, Austria* the intervention aims to ensure a close monitoring of participants' vital parameters and lifestyle habits in addition to a better fine-tuning of the medical therapy and regular treatment reminders. The monitoring occurs through the integration into and the adoption of the existing Health Information System with dedicated Web portals or smart-phones for the participants. Diagnostic equipment is provided at the patient's home. Measurements can also be collected and transmitted through nursing staff.

In all these pilots, a personal health coach or health coaching team motivates and empowers the participants to reach recommended lifestyle changes with theory-based health counseling.

The results of these trials will be published during the last quarter of 2012, and information will be released on a regular basis at www.renewinghealth.eu.

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Annual Review of Cybertherapy and Telemedicine 2011

Advanced Technologies in the Behavioral, Social and Neurosciences

Editors: B. K. Wiederhold, S. Bouchard, and G. Riva

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Virtual Healers

Brenda K. Wiederhold, Ph.D., MBA, BCIA

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Virtual Reality in the Mental Health arena is barely over a decade old. Because VR is still such a young and focused field, the members of its community have come together as a tight-knit family. In *Virtual Healers*, Dr. Brenda K. Wiederhold, herself a pioneer of VR, sits down in casual one-on-one interviews with more than a dozen of the top researchers of this select group.



Virtual Healing

Brenda K. Wiederhold, Ph.D., MBA, BCIA

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Along with aliens and time travel, virtual reality (VR) is often thought of as a science fiction dream. Though it was developed nearly five decades ago, the use of VR in the private sector, particularly in the field of patient care, has become a possibility only in the past decade. As programmers are creating more detailed and interactive environments, the rapid advancement of technology combined with decreasing costs has turned VR into a promising alternative to traditional therapies.

Virtual Reality Resources

By Brenda K. Wiederhold, PhD, MBA, BCIA

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We, at the Interactive Media Institute, realized early on that it was relatively difficult for professionals wanting to break into the Virtual Reality (VR) field to locate relevant information. While the material was out there, there was no clear organizational structure or database to link it. To solve this problem, we have put together *Virtual Reality Resources*, a relevant compilation for researchers and clinicians alike.



CyberTherapy Conference Archives 1996-2005

A Collection of all abstracts from the past 10 years of CyberTherapy

By Brenda K. Wiederhold, PhD, MBA, BCIA

\$ 29.95

A decade ago, CyberTherapy, then still in its infancy, only existed as a specialized Virtual Reality and Behavioral Healthcare Symposium at the Medicine Meets Virtual Reality (MMVR) Conference. It is now clear that in 1996, we had only begun to realize what promise might lie ahead for both VR technology and the CyberTherapy Conference.

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Ask the Expert:



& Don Jones

Vice President of Wireless Health, Global Strategy and Market Development, Qualcomm Labs

"We are seeing an increased focus on the consumer when new wireless health devices and services are being designed. Gaming, social networking and digital media are all coming into play to ensure that these innovative health solutions are widely adopted by consumers."



Brenda K. Wiederhold: What is your current position at Qualcomm?

Don Jones: VP of Wireless Health, Global Strategy and Market Development, Qualcomm Labs.

BKW: What first interested you in wireless health? What is your background?

DJ: Before joining Qualcomm to head up our Wireless Health initiative, I developed and grew various healthcare enterprises for 22 years. I was Chief Operating Officer of MedTrans, which was renamed American Medical Response (AMR), the world's largest emergency medical and physician services provider. I have also founded, run and held various senior executive roles at healthcare companies in consumer membership primary care services, women's health, and housecalls. I was first interested in wireless health when I realized my background in emergency services provided a great deal of relevant knowledge about mobile healthcare and the use of wireless technologies. We started using wireless technologies with electrocardiograph medical devices in the 1970s. In between sales of companies, I had an opportunity to advise one of Qualcomm's business units on the use of wireless tech-

nologies in healthcare and this led to the development of a platform that serves companies like CardioNet today. Later, Qualcomm's CEO asked if I might join Qualcomm and take a look at the entire field of wireless technologies in healthcare. After leading multiple successful start-ups, I thought working with Qualcomm might present some really interesting opportunities for companies to partner in wireless health.

BKW: Tell us more about the aims of your trade organization, Wireless-Life Sciences Alliance.

DJ: I founded the Wireless-Life Sciences Alliance (WLSA) because there was not a venue for the leaders of the wireless and healthcare industries to get together and discuss collaboration. Today, WLSA is the world's first organization focused on doing just this – accelerating the convergence of the wireless and healthcare industries. WLSA produces global forums that bridge the gap between the wireless and health industries by enabling new business models and improvements in consumer health, fitness, clinical services, medical devices, and healthcare IT. To see WLSA become the world's foremost industry organization in the wireless health

space is something I am very proud of, but didn't necessarily anticipate. Today WLSA offers members a May Summit targeting the investor and senior executive communities and an October Symposium focused on engineering and clinical integration which has university participation from six continents, the first of its kind in the world. Both events are located in San Diego. Participating companies come from medical device, pharmaceutical, health services and consumer product areas, and is an interesting mix including J&J, St. Jude, P&G, Sanofi-Aventis and many early stage companies.

BKW: You say that one of your favorite mantras is: "Wireless health collapses time and space in healthcareSM." Can you expand on that?

DJ: Wireless technologies collapse time and space (location) in healthcare, in that it enables things to happen faster than they otherwise would. For example, Telcare's 3G-enabled blood glucose meter (BGM) will allow diabetics to send their blood glucose readings to caregivers and reorder their supplies (testing strips, insulin, lancing devices, etc.) in real-time. Tools like Telcare's BGM make managing chronic diseases seamless and easy. Wire-

less Health collapses space in healthcare in that it enables "healthcare" to take place outside of traditional healthcare settings. That is, healthcare isn't just inside the hospital anymore, as wireless technology is bringing it to consumers' homes, to remote villages, etc. Wireless fitness devices enable consumers to be proactive about their health, and improve wellness through personalized health feedback loops that only wireless connectivity provides. Remote monitoring solutions like the Corventis patch are replacing large, in-hospital machinery with peel-and-stick smart band-aids, allowing for monitoring, diagnoses and therapy management to take place in a patient's home, or even in rural areas that didn't have access to health specialists and equipment before.

BKW: You also speak to the importance of taking charge of one's own health. How does wireless health fit in?

DJ: We believe in empowering consumers to take charge of their own health. Currently we live in a "sick care system" where physicians and hospitals make money when people are sick, and consumers react to health problems as they occur. Wireless health and fitness devices can provide consumers with information about their current state of health that they have not had before. Integrating wireless connectivity into health devices and services provides users with real-time feedback and health statistics – "our numbers," so to speak. How many steps have I taken today? How is my weight trending? And more. As more devices and services become available in the marketplace, we will see these numbers aggregated into personalized health dashboards on our phones, tablets and health devices, giving users more knowledge about their health than was ever possible before.

BKW: Tell us more about how Qualcomm's Internet of Everything Modules (IEM), which you describe as "a low-power, compact wireless module that's designed to enable a new wave of highly personalized mobile experiences and services" can improve healthcare.

DJ: Qualcomm's Internet of Everything Module (IEM) design is one of the smallest modules in the world, about the size of a U.S. Quarter or a European Euro, and was originally designed for wearable medical devices. The module design has an accelerometer and GPS, voice and data capabilities, which allow for many health use cases. From fall detection, to emergency response, to location tracking, this module supports many of the functionalities a health sensor needs. Its size, advanced capabilities and power management optimize the design for health and

fitness solutions. The IEM has passed PTCRB Certification and has become a reference module for the OEM module industry to help companies take advantage of the size footprint and technology integration that is possible. As we move to a world of "an Internet of Things," integrated modules like this which facilitate the wireless enablement of many devices, even very small devices, open up a world of connected health possibilities.

BKW: What are you most proud of in your career?

DJ: I am most proud of raising the bar in healthcare services. I've been fortunate to be involved in founding, growing and running many healthcare companies that changed care and improved outcomes for millions of people. Early in my career I created a new service offering called Critical Care Transportation. It's now a \$2.5 billion market sector in Emergency Medical Services (EMS). Growing a small, San Diego-based EMS company into the global, multi-billion dollar giant, AMR, was another eventful part of my experience. The consumer-facing, multi-billion dollar company I founded in Mexico, EMME, was perhaps the most interesting. EMME now employs hundreds of physicians, serving hundreds of thousands of members in Monterrey and Guadalajara, with a very unique business model that is not very different than a cell phone subscription. I'm attracted by opportunities which are not just a "me too" offering, but when new services and products can be brought to the table that enhance the user experience and bring value.

The conception of the West Wireless Health Institute, and joining with Eric Topol, M.D. and Gary and Mary West to make it a reality was another key set of events in my life. I enjoy bringing all the components – the technology, the people and the service concepts – together to improve offerings beyond the status quo.

BKW: What do you predict as the new trends for technology & healthcare for the next decade?

DJ: One trend we're seeing is the shifting from a "sick care" system to a health improvement system. Currently consumers engage with healthcare systems or their healthcare providers when they are sick. Physicians and hospitals make money when patients are sick, and there are no incentives for keeping patients healthy, or for consumers to keep themselves healthy.

Similarly, we are seeing health move from the hospital to the home. As more wireless

health devices, services and apps enter the market consumers are being proactive about their health, and using these tools to improve their fitness and wellness.

There is also an increased focus on the consumer as new wireless health devices and services are being designed. Gaming, social networking and digital media are all coming into play to ensure that these innovative health solutions are widely adopted by consumers.

BKW: Do you feel most people are willing to embrace new technologies?

DJ: Absolutely. In fact, research is showing that not only do consumers want these technologies, but that they are willing to pay for them too. It is projected that 400 million wearable sensors will be in the market annually by 2014. Additionally, in the U.S. alone, out-of-pocket spending (OOP) on healthcare rose from \$380 billion in 2009, which is 13 percent of the total amount spent on health. Consumers are desperate for health solutions and services that enable them to manage their own health instead of paying high prices for treatment in healthcare systems and institutions.

BKW: Anything you'd like to add?

DJ: We are at the cutting edge of a brand new decade of digitally connected services in healthcare. These services will impact the traditional healthcare fields, the physicians, hospitals and service providers, but will ultimately have a much more profound impact on the end user, the consumer, who will become more empowered to manage their own health. If a consumer suffers from a healthcare condition and can monitor their status with wireless health tools, they can assist in their own diagnostics and therapy management. The key in the future will be the ability to combine data from different devices and sources to create real self-management solutions.

Qualcomm is actively working on the technologies to make this a reality – to enable medical device companies, health software companies and health analytics to all play a more convenient and relevant part in our lives while adding real value. We have a great team at Qualcomm and within our Qualcomm Wireless Health group, and I am proud to be a part of laying the groundwork. We have a unique opportunity to partner with the healthcare industry and enable care, services and solutions beyond what currently exists or is even envisioned. I think consumers will be thrilled with the solutions they will see. This is the next chapter of health – and is one I expect to be equally as proud of my work in.



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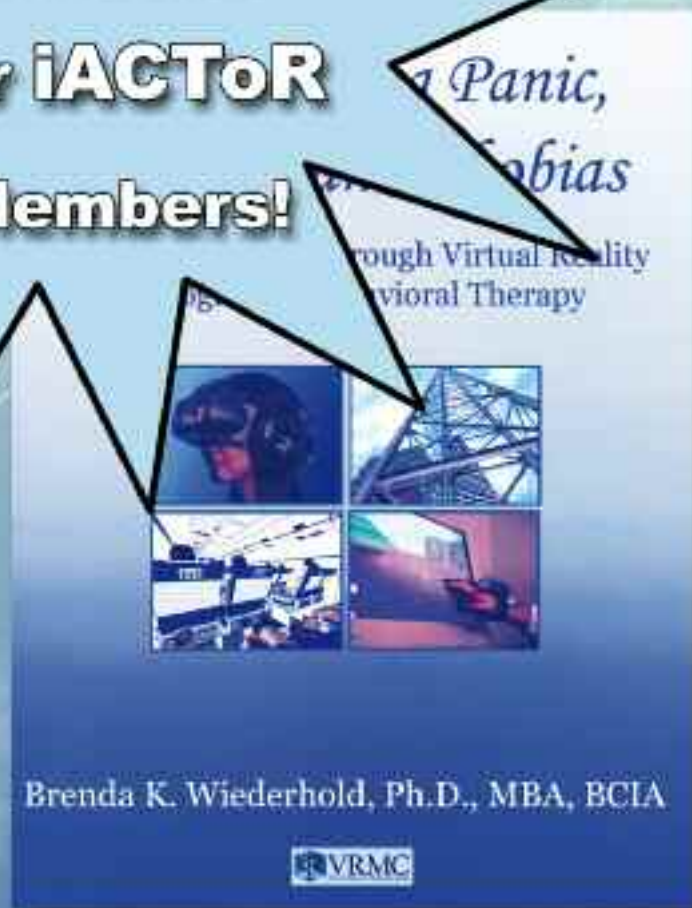
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Conquering Panic, Anxiety, & Phobias

Achieving Success Through Virtual Reality and Cognitive-Behavioral Therapy
By Dr. Brenda K. Wiederhold, PhD, MBA, BCIA

This book is written as a starting point toward helping the large portion of our population that suffers from anxiety disorders to overcome their fears and control their anxiety. It is a resource to enable those suffering from anxiety to take control of their lives and become an active participant in their own recovery.

This book is essentially divided into two parts: a discussion of anxiety and its physical and emotional effects on sufferers. While Virtual Reality Therapy is described, its use is not necessary in order to follow the suggestions in this book. The lessons and worksheets included can help in a variety of areas, not just anxiety, but anger, mild depression, and feelings of helplessness.

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FROM WHERE WE SIT: Europe's Initiative in Using Interreality to Treat and Prevent Metabolic Diseases

► By Giuseppe Riva



For many of us, metabolic diseases are the outcome of an energy imbalance: more/less energy input than expenditure. However, our waistlines are growing in

spite of the huge amount of treatments, diets and fat-free/low-calorie products available to cope with them. As noted by many experts, "Fresh ideas are needed to push the field forward." In this issue we have seen that a possible strategy for improving the actual treatment of metabolic diseases is the use of advanced information technologies. Specifically, different technologies – the Internet, Virtual Reality (VR), and mobile phones – have the potential to improve the assessment and treatment of these disturbances. Nevertheless, these devices are not perfect.

On one side, they typically try to change behaviors and cognitions at a more general level, rather than focusing on actual situations or the "real" context in which they happen. For example, even if VR is a very promising technology for the treatment of obesity and eating disorders, it is a distinct realm, separate from the emotions and behaviors experienced by the patient in the real world; the behavior of the patient in VR has no direct effect on real-life experiences, nor are the emotions and problems experienced by the patient in the real world directly addressed in the VR exposure.

On the other side, these devices are usually used in manualized approaches that allow for a limited amount of customization to be made according to the specific characteristics of a given patient. In real



life, however, patients' most immediate, pressing problem may change from week to week, and the technology is not usually able to effectively refocus on the new need or problem.

A possible path for solving these issues is the use of communication technologies to establish a link between the real world and the technological one: (a) the patient's behavior in the physical world influences their experience in the technological world; and (b) the patient's behavior using the technology influences their experience in the real world. Using this approach, usually defined as "Interreality," it is possible to modify the patient's relationship with his/her dysfunctional behavior and think through more contextualized, experiential processes.

In summary, bridging multimedia experiences (fully controlled by the therapist, used to learn healthy behaviors and coping skills) with real experiences (the therapist can identify critical situations and assess coping skills in real life) – using ad-

vanced technologies (virtual worlds, advanced sensors and smartphones) may be a feasible way to address the complexity of these disturbances (see Figure 1).

Obviously, any new paradigm requires a large amount of effort and time in order to be assessed and properly used. Without a real clinical trial with patients, the Interreality paradigm will remain an interesting, but untested concept. However, direct and indirect costs of metabolic diseases are huge, and some new studies suggest that when managed and organized well, the use of Interreality technologies may lead to cost savings and improved outcome for both patients and health services.

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FURTHER AFIELD: The Changing Landscape of Metabolic Syndrome and Diabetes in Asia

► By Lingjun Kong



Metabolic syndrome exhibits a complex, multifactorial etiology. Research comparing genetically different populations indicates that both genetics and lifestyle issues are

major factors in its development. Approximately 20-30% of the middle-aged population in highly industrialized countries exhibits symptoms of metabolic syndrome. The symptoms of metabolic syndrome are multilayered. For example, a diagnosis of high blood pressure could also indicate high blood glucose, abnormal lipid levels, inflammatory disease, or obesity. Similarly, insulin resistance, urine proteins, heart disease, stroke, kidney failure, depression, and cancer could indicate metabolic syndrome as well. Among these symptoms, insulin resistance is considered to be the underlying factor in the mechanism of metabolic syndrome by the World Health Organization (WHO). Insulin resistance, denoted by hyperinsulinemia or the condition of excess circulating insulin in the blood, can lead to type 2 diabetes, which can result in macrovascular disease. The complications of diabetes are difficult to avoid for any diabetes patient. According to statistics from the American Diabetes Association (ADA) in 2010, the risk of complications for a diabetic patient of three years is over 46%, for a patient of five years is over 61%, and for a patient of over 10 years is 98%. Complications include kidney disease, system edema, headache, nausea, vomiting, oliguria, and the deadly uremia. Other conditions, such as mental illnesses, are indirectly associated with metabolic syndrome due to the increased likelihood of cardiovascular disease, obesity, and other metabolic syn-

drome criteria spurred by the condition or the consequent change in lifestyle.

Diabetes is no longer considered a western disease. It has spread around the world to become a significant global problem. The International Diabetes Federation estimates that by 2025 the number of diabetics will be 380 million, compared to 240 million in 2007. Over half the number of patients will be in Asia where the young and middle-aged will be the most affected age group, as compared to the elderly population in Europe and North America.

Health systems in Asia are battling an epidemic of obesity and diabetes that

thirty years ago. Currently, there are approximately 92 million diabetics in China and 148 million pre-diabetic patients. Soon, China will overtake India as the world's most diabetic country by sheer number. Together, the diabetic patients in China and India account for over half of the total diabetics in the world.

The Asian diet has transformed from one of primarily stir-fried, barbequed, and steamed vegetables and rice to one similar to the western diet of cereals and sugars, as well as vegetable oils and animal sources. Urbanization has tripled within the last half-century which corresponds with decreases in physical activity related to a rural lifestyle. The number of cars,

"Health systems in Asia are battling an epidemic of obesity and diabetes that many are unable to handle. In countries such as India and China, urbanization and economic development have led to great shifts in the health risks of their related populations."

many are unable to handle. In countries such as India and China, urbanization and economic development have led to great shifts in the health risks of their related populations. Life expectancy has dramatically risen and infection rates have significantly dropped. However, a lifestyle transformation has also accompanied accelerated industrialization. Physical activity has decreased and the availability of food has increased; together, these two changes have resulted in increased rates of degenerative diseases such as diabetes and cardiovascular disease. The prevalence of diabetes in China has almost surpassed the 5.5% prevalence rate in Europe and North America, despite the rate being approximately 1%

which is associated with weight gain, has also risen with the development of cities. Moreover, the increase in general wealth has led to greater access to tobacco and alcohol, both of which can contribute to metabolic syndrome. The average number of cigarettes per capita went from one to 15 cigarettes within forty years; alcohol consumption quintupled in that same time.

In addition, with the improvement in quality of life, rates of overweight and obese children have risen. A new study shows the prevalence of metabolic syndrome among school children is 6.6% overall, and 33.1% in obese children. Childhood obesity rates correlate with high blood

“Diabetes comes with a huge monetary cost as well. The WHO predicts that China alone will lose at least \$558 billion in healthcare costs due to heart disease, stroke and diabetes over the next decade.”

pressure, dyslipidemia, and especially, insulin resistance. In Asian Indian families with a history of type 2 diabetes in a first-degree relative, a child with a high waist-to-hip circumference ratio can have up to an 86.4% chance of developing type 2 diabetes.

Population-wise, Chinese women tend to have lower instances of cardiovascular problems, potentially due to the differing use of tobacco and alcohol within the culture's social context. However, the culture may have developed and supported an overweight image within the wealthier class. This also correlates to the higher prevalence of metabolic syndrome in the

highly urbanized regions of the country, specifically with the upper-class. Stress and other factors related with city life further contribute to this trend.

Diabetes comes with a huge monetary cost as well. The WHO predicts that China alone will lose at least \$558 billion in healthcare costs due to heart disease, stroke and diabetes over the next decade. Several medical organizations have been aware of the rising trend in metabolic syndrome in Asia for many years and have been searching for methods to reverse the change. They are establishing physical fitness programs, recommending doctors to emphasize the importance of eating right

and being active, and also urging towns to grow their own food to avoid the influence of the western diet. Although implementation is difficult for countries of such severe infrastructure and healthcare, major steps have already been made. India, Pakistan and China are the top leaders of insulin manufacturers in the world, especially with the increased need of human, animal, and analogue insulin for their local markets. Wireless health monitoring and healthcare devices have become more technologically advanced and accurate. Most importantly, with more than half of the diabetes patients in the world residing in Asia now, science has strengthened the understanding of this complex disease – the first step in battling it.

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Advanced Technologies in Behavioral, Social and Neurosciences

Volume 167 Studies in Health Technology and Informatics

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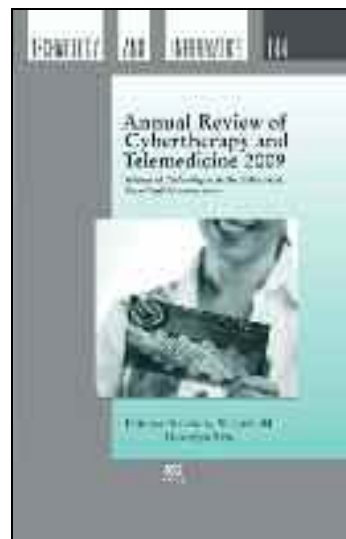
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C&R in the UAE

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A lack of resources and funding in the United Arab Emirates' mental healthcare sector have led to growing concern among experts and residential healthcare providers. The Dubai Health Authority and UAE Ministry of Health, along with several public and private healthcare organizations, are launching an aggressive campaign to improve the state of care, as well as giving attention to the drastic increase in metabolic disorders in the region.

As recently as 2007 local mental experts spoke to the lack of provisions in mental healthcare services in the United Arab Emirates (UAE), quoted in an Arabian Business article saying the severe shortage of certified psychologists had contributed to the region hitting "rock bottom." The "absolute lack of resources," they said, further encouraged existing stigmas and continues to result in many sufferers remaining undiagnosed and untreated.

Like many Middle Eastern and Asian countries, mental health in the UAE has tradi-

"The UAE has the second highest rate of diabetes – 18.7% in 2009 – and cardiovascular disease is the main cause of death, making up 28% of total deaths each year."

tionally been a taboo subject. The stigma has led to a lack of counselors and specialists in the field; many residents still be-

lieve mental diseases are contagious, and female psychologists are rare due to the fact that they will find it nearly impossible to marry if they obtain a related degree. In a country with a population of 4.8 million inhabitants, a scant 180 special psychiatrists were practicing in 2009, as noted by Dr. Bahjat Balbous, a psychiatrist at Al Amal Hospital, in a 2009 Khaleej Times article.

The lack of specialists and hospitals dedicated to caring for psychiatric patients means that no standardized means of funding treatment have been devised;

most private insurance plans do not cover mental healthcare services and possible solutions explored include private con-

tributions, a charity fund, government assistance or insurance coverage, as a possible means for financial support. Many healthcare providers and government officials stress the need for welfare initiatives to prevent and treat cases involving mental illness.

Although plans have been enacted to combat these problems, the scarcity of valid, reliable and culturally relevant psychiatric tools for research in the Arab world has led to complications, including a lack of reliable epidemiological base line data; large-scale community surveys are rarely used. Methodological problems with assessment and evaluation as well as culturally divergent concepts of mental disorders has hindered an improvement or furthered understanding of the shortcomings of the system.

While depression and anxiety are the most common mental disorders in the UAE, sim-



Population (Million)	4.765
Life Expectancy (Years)	78
Fertility Rate	1.9
Population Median Age (Years)	31
Population Density (Persons Per Sq Km)	59
Percentage of Urban Population	78%
Annual Population Growth Rate (%)	2.8%
Unemployment Rate	4%
Hospital Beds (Per 100,000)	190
Psychiatrists (Per 100,000)	3.75
Annual Rate of Suicide in Dubai Between 1992 and 2000 (Per 100,000)	6.2
Indian Migrant Worker Suicides (% of Total Cases of Suicides in Dubai)	70%
Total Expenditure on Health (as Percentage of GDP)	2.8%
Out-of-pocket Expenditure as a Percentage of Private Expenditure on Health	0.66%

ilar to other countries around the globe, suicide rates are exponentially higher than other developed countries. A large concentration of Indian migrant workers subjected to social abuse and desperate financial situations resulted in a suicide rate of one every three days in 2010, leading to a large amount of media coverage and public attention. As well as tackling issues of social abuse and unethical practices, a growing need for counseling services in the camps has been recognized.

The stigma does little to help the problem with the number of people suffering from mental health issues and depression due to everyday stress, lack of sleep, and drug abuse, numbers that continue to rise steadily.

Rising Rates of Obesity

Another major health concern facing the UAE is rapidly rising obesity rates. The country was recently ranked #18 on the Forbes'

list of fattest countries, and 68.3% of its residents are currently categorized as overweight. Furthermore, the UAE has the second highest rate of diabetes – 18.7% in 2009 – beat only by the tiny Pacific island nation of Nauru where one-third of the population suffers from the disease.

A 2009 survey conducted in the UAE by VLCC, a private, multinational lifestyle man-

cultural or genetic predisposition, and adverse climate.

As well as being linked to comorbid conditions like diabetes, recent research has highlighted the negative effect that being overweight can have on quality of life. Eighty percent of the survey's respondents agree that being overweight negatively affects day-to-day activities.

"In 2009 a week-long awareness drive was held in October to educate nurses and doctors about their critical role in caring for psychiatric patients as well as to further educate the public and aim to eliminate the stigma surrounding the issue [of mental healthcare]."

agement organization, recorded respondents' opinions on the topic. Top reasons contributing to rates of obesity were listed as Dubai's sedentary lifestyle, lack of knowledge about the disease, poor diet,

Several public and private healthcare organizations are launching preventative health initiatives to help raise awareness of the problem. "Slimming programs" offered by companies such as VLCC focus on lifestyle



and behavioral modification using a customized program implemented with the help of a specialized team of doctors, nutritionists, counselors and physiotherapists.

Moving Forward

Recognizing the need to promote awareness, The Dubai Health Authority has taken important measures to change traditional misconceptions and launched a Mental Health Campaign at Rashid Hospital on World Mental Health Day on October 10 in 2008. The same year the UAE Ministry of Health launched a project to initiate research into the status of existing mental healthcare services, as well as to start screening patients for mental health disorders at the primary care level. Primary healthcare centers have been recognized as key components in the goal to diagnose a larger number of patients suffering from men-

tal disorders and the first step has been recognized as educating primary caregivers, who often times fail to understand underlying mental health issues and simply treat patients for physical ailments. It is estimated that 60% of cases could be diagnosed and treated at this level, but only 25% of diagnosed patients currently receive treatment.

The following year, a week-long awareness drive was held in October to educate nurses and doctors about their critical role in caring for psychiatric patients and further educate the public and aim to eliminate the stigma surrounding the issue. A "Mental Health Challenges at Workplace in the UAE" seminar was also held during the drive urging Human Resources managers and other company representatives to actively screen employees to pick up on early signs of depression and other mental health disorders. To discourage stigmatization of

these individuals, employers were asked to support them in getting treatment and welcome them back to the workplace after treatment.

These practices were supported by the Indian Consulate in response to the alarming number of suicides and undetected cases of depression and mental disorder in the Indian work camps. Free counseling services are offered to the community, who are directed to call a counseling helpline in times of distress. Counseling services will continue to be promoted and strengthened at the camps in the future.

Sources:

World Health Organization and the Organization for Economic Cooperation and Development.



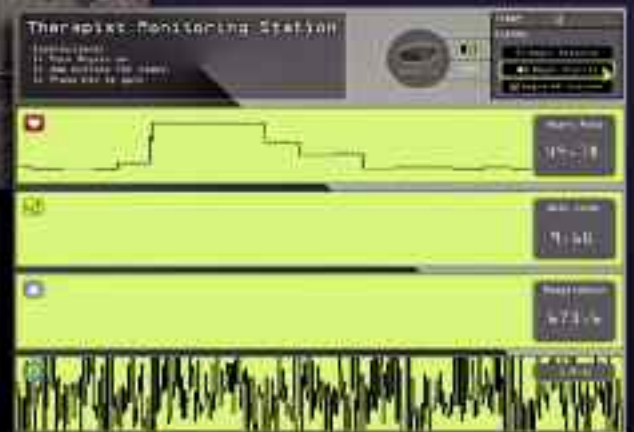
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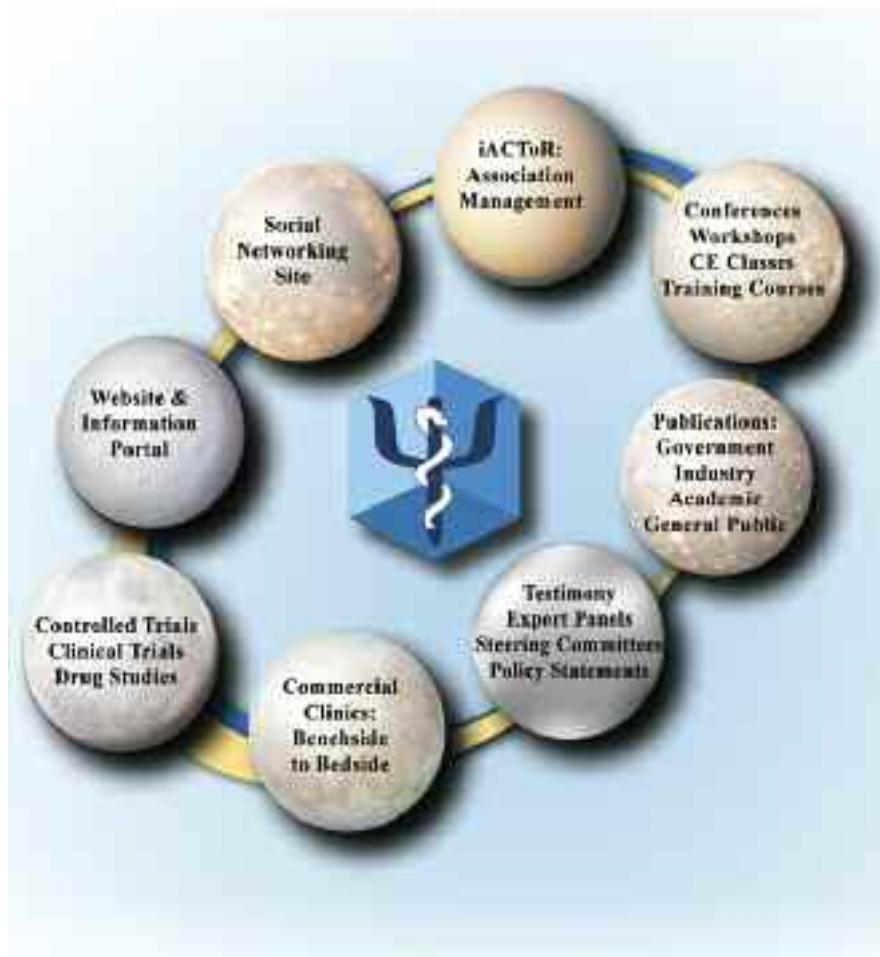
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