



The U.S. Department of Health and Human Services
National Institutes of Health

OBSSR FACT SHEET



Public Health Achievements of the Behavioral And Social Sciences: Improving Health at Home and Abroad

Reducing Tobacco Use

The biggest public health success story of the 20th century may very well be the reduction in tobacco use and smoking-related diseases. Lung cancer is the leading cause of cancer death—accounting for about a third of all cancer deaths—and smoking is the most important risk factor for lung cancer.¹ Behavioral and social science research has made great strides in preventing youth uptake of smoking and in developing behavioral and pharmacological interventions that have helped millions of smokers to quit. The dramatic reduction in male smoking from 51 percent in 1965 to less than 24 percent in 2006² has played a major role in decreasing cancer death rates.^{3,4} Although smoking still kills more women than breast cancer, rates are slowing as women quit and fewer adolescents start. Without this research, more than 45 million Americans might still be smoking,² with thousands of preventable deaths and millions of dollars in excess costs.

Improving Mental Health

About one in four adults in the U.S. suffers from a diagnosable mental disorder in a given year⁵—more than 57 million adults.⁶ Major depression is a leading cause of disability in the U.S.⁷ Behavioral and social science research has made enormous strides in past 30 years in understanding the bio-behavioral mechanisms that underlie mental disorders and

developing effective treatment interventions. Effective and cost-effective therapies that combine behavioral and pharmacological treatments are now available for depression, anxiety disorders, and alcohol and drug abuse.

Preventing Diabetes

Diabetes can lead to devastating complications such as heart disease, stroke, blindness, and premature death. Diabetes is growing at an epidemic rate, with more than 20 million Americans currently affected, and 54 million with pre-diabetes. For many years, scientists believed that medication was the only tool to prevent and treat diabetes. Medication can prevent some of these complications but does not eliminate all the adverse consequences of diabetes. A landmark study called the Diabetes Prevention Program demonstrated that lifestyle interventions – modest weight loss and regular physical activity—can reduce the risk of developing Type 2 diabetes in high-risk adults by 58 percent, compared to 31 percent reduction with medication alone.⁸ These findings led to “Small Steps, Big Rewards,” the first national diabetes prevention campaign.

Slowing the HIV/AIDS Epidemic

HIV/AIDS is no longer the epidemic it once was in the U.S. thanks to breakthroughs in the biological, behavioral, and social sciences. Whether the focus

is on preventing transmission, engendering trust to encourage testing and early treatment, increasing adherence to complex medical treatments, or improving access to health services, slowing the spread of HIV/AIDS requires understanding and changing human behavior at individual, group, and community levels. Research in the behavioral and social sciences has extended our understanding of decision-making, drug abuse, and sexual behavior and has resulted in innovative interventions that—in combination with effective medications—have had a dramatic impact. The number of people infected with HIV each year has dropped from a peak of 150,000 in the early 1980s to approximately 40,000 today, and mother-to-child transmission has fallen 94% from its peak in 1992.⁹

Reducing Sudden Infant Death Syndrome (SIDS)

Also known as “crib death”, SIDS is a leading cause of infant death, claiming the lives of more than 2000 infants each year in the U.S.¹⁰ One of the leading risk factors for SIDS is entirely behavioral – stomach sleeping. Behavioral and social sciences research led

to the nationwide Back to Sleep Campaign which was launched in 1994 to promote infant back sleeping to prevent SIDS. Back sleeping has increased from 13 percent in 1992 to 76 percent in 2006,¹¹ and SIDS has declined by more than 50 percent.¹²

Reducing the Health Burden of Poverty

Discoveries in the behavioral and social sciences can inform life-saving environmental and policy changes. One example is the PROGRESA study¹³ (Programa Nacional de Educación, Salud, y Alimentación), an anti-poverty program begun in 1997 that provides aid to more than 4 million poor Mexican families. The PROGRESA intervention was associated with better growth and lower rates of anemia in low-income, rural infants and children in Mexico. This large-scale, real-world study demonstrated that anti-poverty programs that combine education, health, and nutrition interventions can improve the capacity of families to pull themselves out of poverty and escape the adverse health effects that often ensnare generations. PROGRESA continues in Mexico today under the name Oportunidades, and has been adopted in more than 20 countries.

Promise of the Behavioral and Social Sciences: Transforming Health and Health Care

Even with the dramatic contributions that behavioral and social sciences research has made to date, much more needs to be done to understand the role of behavioral and social factors in disease and to use that knowledge to improve the Nation's health. There is strong evidence that half of all deaths in the U.S. can be attributed to behavioral factors such as smoking, poor diet, and physical inactivity.^{14,15} In addition, behavioral and social factors contribute to the staggering costs of preventable morbidity and mortality. Undoubtedly, biomedical discoveries like the mapping of the human genome have transformed medicine over the past 20 years. Breakthroughs in the behavioral and social sciences over the next 20 years will be critical to address our most pressing public health challenges and to transform health care. Several exciting developments presage the breakthroughs that are on the horizon.

The Role of Psychosocial Factors in Cancer

There is strong evidence that chronic depression, hopelessness, marital disruption, stress, and social support affect various biological processes that influence cancer incidence, progression, and survival. Behavioral stress management interventions have been shown to influence immune function in cancer patients, raising the possibility that these therapies might be useful in battling the disease.¹⁶ Similarly, drugs that block the actions of certain stress hormones have shown promise in reducing cancer progression in animal models and may reduce the risk of certain cancers in humans.¹⁷ More work is needed to understand how psychosocial factors are linked to cancer and to identify new therapeutic targets.

Gene by Environment Interactions

The longstanding debate about nature versus nurture has been turned on its head. Scientists now recognize that it is not a question of genes or environment, but rather, how genes and environment interact in complex ways to explain virtually every observable trait. Take the link between stress and depression: recent research has demonstrated that genetic vulnerability plays a key role in explaining why stressful life events result in depressive symptoms, diagnosable major depression, and suicide attempts among some individuals but not others.¹⁸ In the same way that “personalized medicine” may tailor medical treatment based on an individual’s genetic makeup, behavioral and social science interventions will also benefit from a more sophisticated understanding of the interactions among genetic, personal, and environmental factors in human behavior.

Understanding Behavior in Real Time in the Real World

Researchers and clinicians have long relied on patient’s recall of past behavior to understand their symptoms, concerns, and treatment needs. Patients are asked to describe, for example, how intense their pain is during the day, how strong their cravings are to smoke, and on how many days they experienced pain or anxiety or depression in the last month. This information is then used to guide treatment or to shape research questions. The challenge is that recall is often inaccurate, and the complexity and time-sensitive changes of psychological, behavioral, and physiological processes are often missed. A measurement approach called Ecological Momentary Assessment (EMA) allows individuals to provide multiple reports about their experiences in real-time, in real-world settings, over time and across situations. EMA allows for observation of behaviors and moods as they normally occur in people’s natural environments, in response to naturally occurring events. Handheld computing devices and physiological sensors have created exciting opportunities to capture a rich, dynamic picture of people’s experience – essentially, the ability to move out of the laboratory and into real life. For example, EMA data on job strain and heart rate did a better job predicting which patients would develop blocked arteries than did global questionnaires and laboratory data.¹⁹ EMA techniques have been used to study the full range of human behavior and hold enormous potential to inform breakthroughs in behavioral and biomedical treatments.

For more information, please visit:

<http://obssr.od.nih.gov>

or contact

Ann Benner

Tel: (301) 594-4574

Email: annb@nih.gov

Literature Cited

- ¹ American Cancer Society. Cancer Facts & Figures 2008. Atlanta: American Cancer Society; 2008.
- ² Centers for Disease Control and Prevention. Cigarette smoking among adults—United States, 2006. *MMWR Morb Mortal Wkly Rep*. 2007 Nov 9;56(44):1157-61. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5644a2.htm>.
- ³ Sedjo RL, Byers T, Barrera E Jr, Cohen C, Fontham ET, Newman LA, Runowicz CD, Thorson AG, Thun MJ, Ward E, Wender RC, Eyre HJ; ACS Cancer Incidence & Mortality Ends Committee. A midpoint assessment of the American Cancer Society challenge goal to decrease cancer incidence by 25% between 1992 and 2015. *CA Cancer J Clin*. 2007 Nov-Dec;57(6):326-40.
- ⁴ Thun MJ, Jemal A. How much of the decrease in cancer death rates in the United States is attributable to reductions in tobacco smoking? *Tob Control*. 2006 Oct;15(5):345-7.
- ⁵ Kessler RC, Chiu WT, Demler O, Walters EE. Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Arch Gen Psychiatry*. 2005 Jun;62(6):617-27.
- ⁶ U.S. Census Bureau Population Estimates by Demographic Characteristics. Table 2: Annual Estimates of the Population by Selected Age Groups and Sex for the United States: April 1, 2000 to July 1, 2004 (NC-EST2004-02) Source: Population Division, U.S. Census Bureau Release Date: June 9, 2005. <http://www.census.gov/popest/national/asrh/>
- ⁷ Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL. Measuring the Global Burden of Disease and Risk Factors, 1990-2001. In *Global Burden of Disease and Risk Factors*. Eds. AD Lopez, CD Mathers, M Ezzati, DT Jamison, and CJL Murray. New York, NY: Oxford University Press and The World Bank; 2006. Available at <http://files.dcp2.org/pdf/GBD/GBD.pdf>.
- ⁸ Knowler WC, Barrett-Connor E, Fowler SE, et al.; Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*. 2002 Feb 7;346(6):393-403.
- ⁹ Centers for Disease Control and Prevention. HIV Prevention in the Third Decade: Activities of CDC's Divisions of HIV/AIDS Prevention. October 2005. Available at <http://www.cdc.gov/hiv/resources/reports/hiv3rddecade/pdf/HIV3rdDecade.pdf>.
- ¹⁰ Mathews TJ, MacDorman MF. Infant mortality statistics from the 2004 period linked birth/infant death data set. *Natl Vital Stat Rep*. 2007 May 2;55(14):1-32.
- ¹¹ National Infant Sleep Position Study. The usual position in which mothers place their babies to sleep: data from the national NISP telephone survey for years 1992 – 2006. Accessed May 2, 2008 at http://dccwww.bumc.bu.edu/ChimeNisp/Tables_in_PDF/NISP%201992-2006%20The%20usual%20sleep%20position.pdf.
- ¹² Centers for Disease Control and Prevention (CDC). Sudden infant death syndrome—United States, 1983-1994. *MMWR Morb Mortal Wkly Rep*. 1996 Oct 11;45(40):859-63.
- ¹³ Rivera JA, Sotres-Alvarez D, Habicht JP, et al. Impact of the Mexican program for education, health, and nutrition (Progresá) on rates of growth and anemia in infants and young children: a randomized effectiveness study. *JAMA*. 2004 Jun 2;291(21):2563-70.
- ¹⁴ McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA*. 1993 Nov 10;270(18):2207-12.
- ¹⁵ Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA*. 2004 Mar 10;291(10):1238-45.
- ¹⁶ Antoni MH, Lutgendorf SK, Cole SW, et al. The influence of bio-behavioural factors on tumour biology: pathways and mechanisms. *Nat Rev Cancer*. 2006 Mar;6(3):240-8.
- ¹⁷ Perron L, Bairati I, Harel F, Meyer F. Antihypertensive drug use and the risk of prostate cancer (Canada). *Cancer Causes Control*. 2004 Aug;15(6):535-41.
- ¹⁸ Caspi A, Sugden K, Moffitt TE, et al. Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science*. 2003 Jul 18;301(5631):386-9.
- ¹⁹ Kamarck TW, Muldoon M, Shiffman S, Sutton-Tyrrell K. Experiences of demand and control during daily life are predictors of carotid atherosclerotic progression among healthy men. *Health Psychol*. 2007 May;26(3):324-32.