



Pilot Program of Research to Integrate Substance Abuse Issues into Mainstream Medicine

An RWJF national program

SUMMARY

The *Pilot Program of Research to Integration Substance Abuse Issues into Mainstream Medicine* (PRISM) (a program of the Robert Wood Johnson Foundation) sought to encourage physicians and health care researchers to address the effects of alcohol and drug abuse on serious chronic illnesses.

The researchers at the [Treatment Research Institute](#) running the program:

- Commissioned 10 systematic reviews of studies that analyzed the relationship between alcohol or drug use and chronic illnesses and conditions.
- Selected five research projects for funding that analyzed the relationship between alcohol and drug use and sleep disorders, hypertension, breast cancer, type II diabetes and coronary artery risk. See [Appendix 1](#) for details on the grants and contact information.

Key Findings From Funded Research Projects

- Among men, level of alcohol consumption was associated with mild or worse sleep-disordered breathing. There was no significant association between alcohol use and sleep-disordered breathing or other sleep problems among women.
- People who drink three or more drinks per day were more likely to suffer from hypertension than people who do not drink.
- Among people with normal blood pressure at baseline, former drinkers (who had not consumed alcohol for at least one year) were significantly more likely to have hypertension after five years than moderate drinkers.
- Light or moderate drinking is associated with decreased hypertension among European Americans but not among African Americans.
- Among sisters who either had breast cancer themselves or did not have breast cancer but had a sister who did, there was a 30 percent increased risk of breast cancer from

drinking about one drink per day. Among unrelated women, there was no apparent overall effect of alcohol drinking on breast cancer.

See [The Projects and Their Findings](#) for more findings from the funded research projects.

Key Communications

- The systematic reviews yielded 10 papers published in peer-reviewed journals.
- The funded research projects yielded one book chapter, 13 articles and presentations at two national meetings.

Funding

The Robert Wood Johnson Foundation (RWJF) provided \$758,000 for the program through three grants between December 2003 and June 2006 to the Treatment Research Institute. See [Funding](#) for further explanation. RWJF also provided a total of \$428,811 in grants to the five funded research projects.

THE PROBLEM

According to researchers at the Treatment Research Institute (TRI), (a not-for-profit organization dedicated to reducing the effects of alcohol and drug abuse through scientific research and dissemination of evidence-based information):

- Chronic diseases such as diabetes, hypertension and sleep disorders are involved in more than 70 percent of all health care received by adults.
- Between 25 and 35 percent of adults receiving care for medical problems [abuse](#) alcohol or drugs. An additional 15 percent are [addicted](#) to alcohol or drugs.
- Medically harmful alcohol or drug use by patients with chronic diseases leads to misdiagnoses, poor adherence to prescribed care, unexpected side effects from prescribed medications, poorer outcomes and greater cost.

Many clinicians and researchers who treat chronic diseases know little about the effects of substance use on management of these diseases and are unaware of ways to address substance use in their patients.

- Chronic disease specialists have not yet developed the interest or ability to screen patients for substance use, counsel patients to reduce substance use, prescribe anti-craving medications or adjust medical management strategies to reflect the effects of risky drinking or drug use.
- Researchers in mainstream health care areas have been slow to investigate the effects of excessive alcohol and drug use upon the course, treatment, costs and outcomes of medical conditions.

CONTEXT

RWJF, which had a track record of significant support for substance abuse education and prevention efforts, decided in 2003 to increase its investments dedicated to improving the quality of the treatment system from about \$35 to \$84 million through 2010.

According to RWJF president, Risa Lavizzo-Mourey, M.D., M.B.A., in 2003, the focus on treatment was needed because of "the tremendous gap between what we know about the treatment of substance abuse and addiction and what is actually done in health care settings." (*Advances*, Issue 1, 2003)

THE PROGRAM

This initiative tested the feasibility and effectiveness of developing a large national effort to build a cadre of researchers who integrate substance abuse issues into mainstream medicine.

It aimed to improve the effectiveness and efficiency of health care for common, serious chronic illnesses by encouraging physicians and health care researchers to address the treatable but generally ignored effects of alcohol and drug abuse on those illnesses.

The project explicitly appealed to the enlightened self-interest of doctors by helping them succeed in treating the chronic conditions that comprise their practices rather than by asking them to treat substance abuse.

A. Thomas McLellan, Ph.D., of the Treatment Research Institute (TRI) in Philadelphia directed the initiative. Barbara Turner, M.D., also from the Treatment Research Institute as well as professor of medicine at the [University of Pennsylvania](#), co-directed the initiative.

A national Planning and Scientific Advisory Committee comprised of specialists in chronic health conditions and in substance and alcohol abuse worked with the directors to:

- Identify leading researchers and practitioners in chronic diseases.
- Identify diseases for initial emphasis in the project.
- Select diseases for further study and select researchers to receive grants.

See [Appendix 2](#) for a list of committee members.

Funding

The initiative consisted of a planning phase and an implementation phase. RWJF support for the work came from several sources:

- The planning phase was supported by \$300,000 of unspent funds from an unrelated evaluation grant from RWJF to the Treatment Research Institute (ID# 042093).
- For the implementation phase, project director McLellan used his \$300,000 RWJF [Innovators Combating Substance Abuse Award](#) (grant ID# 049534) to augment \$158,000 in project funds from RWJF (grant ID# 048237). The Innovators Awards are grants to individuals to support their work in bringing creative solutions to the field of substance abuse control.

Two institutes within the federal [National Institutes of Health](#) (NIH) also supported the project:

- The [National Institute on Alcohol Abuse and Alcoholism](#) (NIAAA) provided \$160,000.
- The [National Institute on Drug Abuse](#) (NIDA) provided \$43,000.

Planning Phase

During the planning phase, which began in 2001, Treatment Research Institute staff convened focus groups of physicians knowledgeable about both substance use and mainstream medical issues to recommend illnesses for study that are:

- Prevalent in many settings and populations.
- Adversely affected by substance use.
- Likely to have improved outcomes as a result of practical changes in standard physician practice.

The panels recommended a list of more than 20 diseases meeting these criteria. McLellan and Turner then commissioned researchers to conduct systematic reviews of existing studies that analyzed the relation between alcohol or substance abuse and several of the identified chronic conditions.

The co-directors selected researchers with expertise in the selected chronic conditions to conduct these reviews, rather than researchers with expertise in alcohol or drug abuse. The expectation was that papers based on the reviews would more likely reach the target audience of medical practitioners if researchers known to practitioners prepared them.

The 10 commissioned reviews included:

- Five that examined the effects of alcohol on:
 - Diabetes.
 - Hypertension.
 - Sleep disorders.

- Depression.
- Bone disease.
- Two that reviewed marijuana's effects on:
 - Lung cancer.
 - Pulmonary function and respiratory problems.
- One that reviewed the role of opiate drugs in chronic low back pain.
- Two that examined, in a large HMO:
 - The prevalence of medical and psychiatric conditions among patients in alcohol and drug treatment.
 - The prevalence and cost of care of medical and psychiatric conditions among **hazardous** drinkers and drug users not in treatment.

See [Appendix 3](#) for a short description of findings from the systematic reviews. See the [Bibliography](#) for a list of all publications.

Implementation Phase

The RWJF *Program of Research to Integrate Substance Abuse Issues into Mainstream Healthcare* (PRISM) started in January 2004.

During the two-year implementation phase, project staff worked to achieve greater recognition by the research and medical community of the relationship between alcohol and drug abuse and chronic diseases. They met with officials from:

- The [National Cancer Institute](#), the [National Heart, Lung and Blood Institute](#) and other institutes in the NIH to generate interest among staff in creating a crosscutting agenda that would result in collaborative funding across medical and substance abuse-focused institutes within the NIH.
- National medical societies such as the [Society of General Internal Medicine](#) and the [American College of Physicians](#) to:
 - Generate interest among researchers and practitioners in conducting additional studies to understand better the nature of the relationship between alcohol and drug abuse and chronic diseases.
 - Begin to develop practice guidelines for physicians to use in treating patients.

Funded Research Projects

Project staff, in conjunction with the Planning and Scientific Advisory Committee, recruited researchers in mainstream health services to study the effects of alcohol and

drug use on health outcomes of major chronic illnesses. From 15 applications, staff selected five for funding. These projects explored the relationship between substance use and:

- Sleep disorders.
- Hypertension.
- Breast cancer.
- Type II diabetes.
- Coronary artery risk development.

Project staff and funded researchers focused on analyzing existing data from studies funded by the NIH. The theory behind this strategy was that using these data sets would be of interest to NIH staff and prompt subsequent funding of studies in these areas.

See [Appendix 1](#) for grant details and contact information on the five projects.

Challenges

McLellan and Connie Pechura, Ph.D., a senior program officer at RWJF, noted the following challenges in implementing the *Pilot Program of Research to Integrate Substance Abuse Issues into Mainstream Medicine*:

- It was hard to interest mainstream medical researchers in conducting research about alcohol. Researchers were interested in focusing on the disease itself and either did not understand or were not interested in the role of alcohol or drugs in the disease.

To address these challenges project directors:

- Brought chronic disease researchers and physicians onto the planning and scientific advisory committees.
- Worked closely with a variety of medical societies, providing them with information about progress and findings from the studies.

These efforts paid off, and by the end of the project, according to McLellan, many medical researchers were interested in understanding how alcohol and drugs affect chronic diseases.

- Project staff had planned to conduct analyses across the five funded research studies to identify a level of alcohol consumption that would be medically ill advised for these illnesses. They were unable to conduct these analyses for two reasons, according to McLellan's report to RWJF:
 - The way that each study measured alcohol consumption was quite different.

- Alcohol has broad and different effects on a range of chronic diseases. Modest amounts of alcohol may be beneficial or detrimental, depending upon the specific disease considered.
- Engaging the several institutes in the NIH to collaborate in studying the effect of alcohol across a range of chronic illnesses proved more challenging than anticipated. Each institute focused on its particular disease or condition more than on the role of alcohol across conditions.

McLellan and Turner and staff at the Treatment Research Institute have continued to work with the institutes on developing a crosscutting initiative and most of the researchers who received PRISM grants have been awarded subsequent grants from the National Institutes of Health, according to McLellan and Connie Pechura, Ph.D., the program officer at RWJF (now at the Treatment Research Institute).

Communications

The project produced the following communications:

- The systematic reviews produced 10 papers published in peer-reviewed journals such as *Annals of Internal Medicine*, *Journal of the American Medical Association* and *American Journal of Hypertension*.
- The funded research projects yielded:
 - One book chapter.
 - Some 13 articles published in journals such as *Drug and Alcohol Dependence*, *American Journal of Cardiology* and *Hypertension*.
 - Presentations at the 2005 annual meetings of the Society of General Internal Medicine and of the College on Problems of Drug Dependence.

See the [Bibliography](#) for citations.

THE PROJECTS AND THEIR FINDINGS

Descriptions of the five funded research projects and their findings follow. See the [Bibliography](#) for publication details.

Examining the Association of Alcohol Consumption and Sleep Disturbances

[University of Wisconsin School of Medicine and Public Health](#) (Madison, Wis.)

Grant ID# 051511

[Sleep-disordered breathing](#) and [insomnia](#) affect millions of adults in the United States and are associated with health problems such as hypertension, cardiovascular disease and impaired daytime functioning. Alcohol use and abuse are associated with sleep

disturbances, but no long-term studies have examined patterns of alcohol use in relation to sleep disturbance over many years.

The goal of this project was to investigate the role of alcohol consumption in the prevalence, severity, incidence and progression of sleep disordered breathing, insomnia and abnormal [sleep architecture](#).

Researchers analyzed data from 796 men and 657 women who participated in the Wisconsin Sleep Cohort Study. The Sleep Cohort Study, funded by the NIH, tracked people who were assessed for alcohol use and sleep disorders at four-year intervals for up to 12 years.

Researchers assessed sleep disturbances by monitoring participants via machine during overnight sleep-study visits. They assessed alcohol use via questionnaires completed by participants.

Findings

Researchers reported the following findings in an article published in the *Journal of Clinical Sleep Medicine* and in two abstracts published in *Sleep*:

- **Among men, level of alcohol consumption was associated with mild or worse sleep-disordered breathing.** Higher levels of drinking were associated with higher risk for sleep-disordered breathing. With each additional drink per day, men's chances of having mild or worse sleep-disordered breathing increased by 24 percent. (*Journal of Clinical Sleep Medicine*)
- **Men who said they drank from seven–13 drinks per week reported less difficulty falling asleep than men who did not drink.** However, men who drank 14 or more drinks per week reported increased sleep disturbances later in the night. (*Sleep*)
- **There was no significant association between alcohol use and sleep-disordered breathing or other sleep problems among women.** This may be because too few women reported high levels of drinking to address the association. (*Journal of Clinical Sleep Medicine, Sleep*)

Studying the Correlates and Consequences of Alcohol-Associated Hypertension

Kaiser Foundation Hospitals, [Kaiser Foundation Research Institute](#) (Oakland, Calif.)

Grant ID# 051512

Studies have identified an association between drinking two or more drinks per day and higher blood pressure, making drinking a probable risk factor for hypertension. Questions remain as to whether lighter drinking is related to higher blood pressure, whether the choice of drink or drinking patterns are associated with higher blood pressure and

whether alcohol-related hypertension leads to other health problems associated with hypertension.

This project aimed to elucidate the relationship between drinking alcohol and hypertension. Researchers explored factors such as whether:

- Different levels of drinking affect cardiovascular or coronary disease or hospitalization.
- Choice of alcoholic beverage or weekend binge drinking is related to hypertension.
- Underreporting of drinking sets a falsely high threshold for the alcohol-hypertension relation.

Researchers analyzed health information from 127,212 men and women in San Francisco and Oakland, Calif., who voluntarily took health examinations offered by [Kaiser Permanente](#), a comprehensive prepaid health care program. Patients also completed questionnaires regarding their medical and drinking histories.

Findings

Researchers presented the following findings in articles published in the *Journal of Studies on Alcohol and Drugs* and the *American Journal of Cardiology* and in a report to RWJF:

- **People who drink three or more drinks per day were significantly more likely to suffer from hypertension than people who do not drink.** (*American Journal of Cardiology*)
- **Among people with hypertension, level of alcohol consumption did not appear to affect subsequent deaths from cardiovascular or coronary heart disease or frequency of hospitalization.** (*American Journal of Cardiology*)
- **The increased prevalence of hypertension seen among people who reported drinking just one or two drinks per day appeared, in part, to be due to underreporting of alcohol intake level.** People who drink one or two drinks per day but whose prior records indicated that they drank more or had been diagnosed with alcohol problems were more likely to have hypertension than people who said they drink one or two drinks whose prior records did not indicate drinking problems. (*Journal of Studies on Alcohol*)
- **People who binge drink or drink on specific days of the week were not more likely to become hypertensive than people who did not binge drink or did not limit drinking to specific days.** (Report to RWJF)

Potential Modification of the Effect of Alcohol on Breast Cancer Risk by Variation in Genes Involved in Alcohol Metabolism

Mailman School of Public Health at Columbia University (New York, N.Y.)

Grant ID# 051536

Although many studies suggest that alcohol is a risk factor for breast cancer, alcohol is not yet universally accepted as such. Genetics play a role in how people metabolize alcohol, suggesting that some people are more at risk of breast cancer from drinking alcohol.

The goal of this project was to investigate the association between alcohol intake, alcohol metabolism and breast cancer risk.

Researchers analyzed data from the Ontario (Canada), New York City, Northern California, Utah and Philadelphia sites of the [Breast Cancer Family Registry \(BCFR\)](#) to determine whether women who drink moderate amounts of alcohol are at increased risk of breast cancer and whether this relationship is influenced by their genetic make-up.

The National Cancer Institute created the multinational Breast Cancer Family Register in 1995 to address urgent breast cancer research questions and to expedite the translation of research results to clinical settings.

Researchers conducted two separate analyses:

- A population-based study of 887 women with breast cancer and 699 women living in the same areas without breast cancer.
- A sister-based study of close to 1,600 women with breast cancer and their more than 1,800 sisters who did not have breast cancer.

Findings

Researchers presented the following findings in a report to RWJF:

- **In the first study, a comparison of breast cancer incidence in women who were not related indicated no apparent overall effect of alcohol drinking on breast cancer.** However, there was some evidence that an individual's particular genetic makeup may affect the relationship between alcohol drinking and breast cancer.
- **In the second study, among sisters who either had breast cancer themselves or did not have breast cancer but had a sister who did, there was a modest (30 percent) increased risk for breast cancer from drinking about one drink per day.** This level of risk among sisters differed according to the genetic makeup of the individual.

Studying Alcohol Consumption and the Incidence of Hypertension and Type II Diabetes Among U.S. Adults

Wake Forest University Health Sciences (Winston-Salem, N.C.)

Grant ID# 051537

Some studies have identified heavy drinking as a risk factor for type II diabetes and hypertension, while others suggest that drinking one or two drinks per day is associated with reduced risk of these conditions.

The objective of this study was to examine the relationship between alcohol consumption and subsequent five-year occurrence of hypertension and type II diabetes among people who did not have either condition at baseline.

Researchers also used available data to explore the relationship between smoking and incidence of type II diabetes.

Researchers analyzed data from 1,625 European-American, African-American and Hispanic participants from Los Angeles; Oakland, Calif.; San Antonio; and the San Luis Valley, Colo. The [Insulin Resistance Atherosclerosis Study \(IRAS\)](#) provided the data.

The NIH funded the Insulin Resistance Atherosclerosis Study to assess the relationships between insulin resistance and risk factors for atherosclerosis among both genders and multiple ethnic groups.

Findings

Researchers reported the following findings in an unpublished article, in a report to RWJF and in an article published in 2005 in *Diabetes Care*:

- **Among people with normal blood pressure at baseline, former drinkers were significantly more likely to have hypertension after five years than moderate drinkers.** Moderate drinkers are those who drink less than one drink per day for women and less than two drinks per day for men. Former drinkers are those who had not consumed alcohol for at least one year. (Unpublished article)
- **Never-drinkers were also more likely to have hypertension after five years than moderate drinkers, though the difference was not statistically significant.** (Unpublished article)
- **Among people who did not have diabetes at baseline, those who were current drinkers five years later did not exhibit increased risk of diabetes compared to never-drinkers.** (Report to RWJF)
- **Among people without diabetes at baseline, those who smoked tobacco five years later had significantly higher incidence of diabetes after five years compared**

with people who never smoked. Some 25 percent of current smokers developed diabetes, compared with 14 percent of never-smokers. (*Diabetes Care*)

Studying the Impact of Alcohol Use on Coronary Artery Risk Development in Young Adults

University of Alabama at Birmingham School of Medicine (Birmingham, Ala.)

Grant ID# 051890

Hypertension affects 32 percent of adults in the United States. Morbidity and mortality due to hypertension are at least three times higher in African Americans than among European Americans. The reasons for this disparity are unclear.

The goals of this project were to:

- Examine the impacts of alcohol consumption on the development, recognition and control of hypertension.
- Analyze whether the impacts vary by race/ethnicity and gender.
- Analyze whether impacts are mediated by adherence to medication protocols and access to and utilization of health care services.

Researchers examined health and alcohol data from the [Coronary Artery Risk Development in Young Adults \(CARDIA\) Study](#). CARDIA is a study of 5,115 people aged 18–30. About half of the study subjects are African American, half are female and half have low educational attainment.

The National Heart, Lung and Blood Institute (NHLBI) created the CARDIA study in 1985 to better understand contributors to changes in risk factors for cardiovascular disease (CVD) during the years of transition from adolescence through young adulthood to middle age.

Study participants underwent extensive health examinations and completed questionnaires at baseline and at two, five, seven, 10 and 15 years after baseline. Participants self-reported their alcohol use at each of the examinations.

Findings

Researchers reported the following findings in presentations at the 2005 annual meeting of the Society of General Internal Medicine and in an article in *Drug and Alcohol Dependence* (May 2007):

- **Light or moderate drinking was associated with decreased hypertension among European Americans but not among African Americans.** African Americans are at generally higher risk of developing hypertension than European Americans. (Society of General Internal Medicine presentation)

- Light drinking means fewer than seven drinks per week for men and fewer than four drinks per week for women.
- Moderate drinking means between seven and 13 drinks per week for men and between four to six drinks per week for women.
- **Alcohol use among young adults is associated with higher physical health-related quality of life 13 years later, but with lower mental health-related quality of life.** (Society of General Internal Medicine presentation)
- **Hard drug use (cocaine, opiates, amphetamines but not marijuana) in young adulthood, even when hard drug use stops, is associated with reduced health related quality of life 13 years later.** The decline in health may be partially explained by persistent tobacco use. (*Drug and Alcohol Dependence*)

CONCLUSIONS

In a report to RWJF, co-director McLellan reported the following conclusion from the various systematic reviews and studies:

- **"Alcohol can have important effects on health and disease management, but these effects can be salutary, neutral or negative, depending on the amount and duration of alcohol consumption, the nature and progression of the chronic illness and the medications prescribed."**

LESSONS LEARNED

1. **Do not assume that agencies with shared interests will be willing to collaborate on crosscutting research projects.** Staffs from the various institutes within the NIH were interested in learning about findings from these studies, but were ultimately unwilling or unable to develop cross-institute projects or funding streams to help move findings into clinical practice. (Project Director, Program Officer)

AFTERWARD

As a follow-up to this program, in November 2006, RWJF provided a \$700,000 two-year grant (see [Program Results](#) on ID# 058529) to the Society of General Internal Medicine to increase the integration of evidence-based research on the effects of alcohol and drug use into the management of common chronic diseases.

Under this grant, the Society of General Internal Medicine is convening a working group of representatives from the [American Academy of Family Physicians](#), the [American College of Physicians](#) and the [American Gerontology Society](#) to:

- Review evidence on the effects of substance use on common diseases and specify areas for potential quality of care practice standards.

- Identify relevant topics for additional systematic reviews.
- Define approaches to improve the incorporation of substance use information into the routine delivery of medical care.
- Define the content of an educational program for primary care clinicians about effects of alcohol and illicit drug use on common diseases.
- Collaborate with NIH representatives to identify appropriate topics for an inter-institute portfolio of research.

NIAAA has committed \$160,000 and NIDA \$60,000 to support this work.

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APPENDIX 1

Research Projects Funded under the Pilot Program of Research to Integrate Substance Abuse Issues into Mainstream Medicine

(Current as of the time of the grant; provided by the grantee organization; not verified by RWJF.)

Examining the Association of Alcohol Consumption and Sleep Disturbances

University of Wisconsin School of Medicine and Public Health (Madison, Wis.)

Amount: \$89,091

Dates: July 2004 to June 2005

ID#: 051511

Contact

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Studying the Correlates and Consequences of Alcohol-Associated Hypertension

Kaiser Foundation Hospitals, Kaiser Foundation Research Institute (Oakland, Calif.)

Amount: \$96,572

Dates: July 2004 to November 2005

ID#: 051512

Contact

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Potential Modification of the effect of Alcohol on Breast Cancer Risk by Variation in Genes Involved in Alcohol Metabolism

Mailman School of Public Health at Columbia University (New York, N.Y.)

Amount: \$99,171

Dates: September 2004 to June 2005

ID#: 051536

Contact

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Studying Alcohol Consumption and the Incidence of Hypertension and Type II Diabetes Among U.S. Adults

Wake Forest University Health Sciences (Winston-Salem, N.C.)

Amount: \$65,008

Dates: July 2004 to September 2005

ID#: 051537

Contact

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Studying the Impact of Alcohol Use on Coronary Artery Risk Development in Young Adults

University of Alabama at Birmingham School of Medicine (Birmingham, Ala.)

Amount: \$90,000

Dates: September 2004 to September 2005

ID#: 051890

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APPENDIX 2

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APPENDIX 3

Summary of Systematic Reviews of Published Research

(Current as of the time of the grant; provided by the grantee organization; not verified by RWJF.)

(See the [Bibliography](#) for publication details.)

Effect of Alcohol Consumption on Diabetes Mellitus: A Systematic Review

Howard AA, Arnsten JH and Gourevitch MN.

Researchers examined 974 citations, ultimately reviewing 32 studies.

Findings

- Drinking from one to three drinks per day is associated with a 33 to 56 percent lower incidence of diabetes and a 34 to 55 percent lower incidence of diabetes-related coronary heart disease than not drinking at all.
- Drinking more than three drinks per day appears to be associated with up to 43 percent increased incidence of diabetes compared with drinking from one to three drinks per day.

Systematic Review of the Effect of Daily Alcohol Intake on Blood Pressure

McFadden CB, Brensinger CM, Berlin JA and Townsend RR

Researchers examined 834 articles and selected for review the nine meeting all selection criteria: specifically, studies that addressed changes in blood pressure after alcohol intake in comparison with no alcohol intake, in both people with hypertension and people without hypertension who had baseline alcohol intake that was light (less than 0.22 oz. per day), moderate (0.22 to less than 1.0 oz. per day) or heavy (more than 1.0 oz. per day).

Findings

- There is a significant but modest elevation in systolic blood pressure (up 2.7 mm Hg) and diastolic blood pressure (up 1.4 mm Hg) shortly after drinking.

- There is a reduction in blood pressure 10–15 hours after drinking and another increase in blood pressure the following day.

Disturbed Sleep and Its Relationship to Alcohol Use

Stein MD and Friedmann PD.

Researchers reviewed 107 articles from five databases.

Findings

- Up to two or three drinks before bedtime initially promotes sleep, but these effects diminish in as few as three days of continued drinking.
- Chronic drinking disrupts sleep and those disruptions may persist for months into abstinence.
- Variability in the measurements of sleep disturbance and alcohol use makes it difficult to determine the strength and direction of the association between drinking and sleep problems.

The Prevalence and Impact of Alcohol Problems in Major Depression: A Systematic Review

Sullivan LE, Fiellin DA and O'Connor PG

Researchers searched three databases and selected 35 studies meeting the selection criteria for review.

Findings

- Some 16 percent of depressed patients had current alcohol problems (at-risk drinking, alcohol abuse or alcohol dependence) compared with 7 percent of the general population who have current alcohol problems.
- About 30 percent of depressed patients had alcohol problems sometime during their lives. In contrast, estimates of the prevalence of lifetime alcohol problems in the general population range from 16 to 24.
- Alcohol problems are more common in people with depression than among the general population. They are associated with worse outcomes over the course of the depression, but there is evidence that antidepressants improve depression outcomes even in people who are dependent on alcohol.

Effect of Alcohol Consumption on Fracture and Bone Density: Systematic Review and Meta-analysis

Berg KM, Kunins HV, Jackson JL, Nahvi S, Chaudhry Am, Harris K, Malik R and Amsten J

Researchers searched four databases and reference lists, ultimately extracting 31 studies from 749 citations.

Findings

- Compared to no or very low alcohol use, drinking one or two drinks per day is associated with greater bone density and less bone loss over time.
- Limited data suggest that drinking more than two drinks per day may be associated with increased bone loss over time.
- Compared to nondrinkers, people who drink between 0.5 and one drink per day are at lower risk of hip fracture but people who drink more than two drinks per day are at increased risk.

The Association Between Marijuana Smoking and Lung Cancer: A Systematic Review

Mehra R, Moore BA, Crothers K, Tetrault J and Fiellin DA

Researchers examined three databases. They reviewed 19 studies that met selection criteria.

Findings

- Studies that examined lung cancer risk factors or pre-malignant changes in the lung offered biological evidence of a potential association between marijuana smoking and lung cancer.
- Observational studies failed to demonstrate an association between marijuana smoking and lung cancer after adjusting for tobacco use. This failure may be due to methodological limitations such as selection bias, small sample size, young participant age limiting time for cancer identification, etc.

Effects of Marijuana Smoking on Pulmonary Function and Respiratory Complications: A Systematic Review

Tetrault J, Crothers K, Moore BA, Mehra R, Concato J, Feillin DA

Researchers searched three databases and reviewed 34 publications that met the search criteria.

Findings

- Eleven of 12 studies that assessed short-term marijuana use found an association between short-term use and dilation in the bronchial tubes.

- All 14 studies that assessed long-term marijuana smoking and respiratory complications noted an association between long-term use and increased respiratory symptoms including coughs, phlegm and wheeze.

Opioid Treatment for Chronic Back Pain: A Systematic Review and Meta-Analysis of Their Prevalence, Efficacy and Association with Addiction

Martell BA, O'Connor PG, Kerns RD, Becker WC, Morales KH, Kosten TR and Fiellin DA

Researchers searched four databases, examined selected literature reviews and bibliographies and solicited unidentified manuscripts from leading pain experts. They ultimately reviewed 42 studies.

Findings

- Opioids are commonly prescribed for back pain, but the proportion of patients who are prescribed opioids varies according to the treatment setting:
 - From 41 to 57 percent of patients in pain treatment centers receive opioids.
 - From 2.6 to 38 percent in specialty groups receive opioids.
 - From 0.14 to 28 percent in primary care practice receive opioids.
- Opioids appear to be effective for short-term (less than 16 weeks) pain relief but their effectiveness in the long-term is less clear.
- Up to 25 percent of people who receive opioids for chronic back pain become addicted.

Medical and Psychiatric Conditions of Alcohol and Drug Treatment Patients in an HMO

Mertens JR, Lu YW, Parthasarathy S, Moore C and Weisner CM

Researchers compared the prevalence of 23 medical and psychiatric conditions among 747 substance-abusing patients and 3,690 non-substance abusing patients from the same health maintenance organization.

Findings

- About one third of medical or psychiatric conditions were more common among substance abuse patients than among non-substance abusing patients.
 - Compared with non-substance abusers, substance abusers had higher prevalence of lower back pain, headaches, arthritis, asthma, acid-related peptic disorders, chronic obstructive pulmonary disorder, hypertension, hepatitis and cirrhosis.

- Compared with non-substance abusers, substance abusers had higher rates of depression, anxiety disorder and psychoses.
- There was no difference between substance abusers and non-abusers in prevalence of breast, lung, prostate cancer, colon cancer, diabetes, renal failure, cerebrovascular diseases and benign conditions of the prostate.

Hazardous Drinkers and Drug Users in HMO Primary Care: Prevalence, Medical Conditions and Costs

Mertens JR, Weisner C, Ray GT, Freman B, and Walsh K

Researchers compared medical conditions and health care costs of 92 primary care patients who were hazardous drinkers (score of eight or higher on the [Alcohol Use Disorders Identification Test](#) [AUDIT], a test that covers quantity, frequency, harmful use and dependence symptoms) and drug users with those of 13,347 patients who were not hazardous drinkers or drug users.

Findings

- One in 10 clinic patients screened for inclusion in the study was a hazardous drinker and/or drug user.
- Hazardous drinkers and drug users had higher prevalences of chronic obstructive pulmonary disorder (3.8 percent versus 1.7 percent), hypertension (20.2 percent versus 13 percent), pneumonia (5.7 percent versus 1.9 percent) and injury and overdoses (37.6 percent versus 20.2 percent) than did non-hazardous drinkers and non-drug users.
- Hazardous drinkers and drug users had higher prevalences of depression (17.6 percent versus 8.2 percent), anxiety (22.1 percent versus 7.2 percent) and major psychoses (6.0 percent versus 1.1 percent) compared with non-hazardous drinkers and non-drug users.
- Medical costs for the period examined did not differ between the two groups, except for those who also had psychiatric conditions, whose medical costs were higher.

APPENDIX 4

Glossary

Alcohol abuse—Alcohol abuse is a pattern of drinking that results in harm to one's health, interpersonal relationships or ability to work. Manifestations include failure to fulfill responsibilities at work, school or home; drinking in dangerous situations such as while driving; legal problems associated with alcohol use; and continued drinking despite problems that are caused or worsened by drinking. Alcohol abuse can lead to alcohol

dependence. (Source: *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV)*, published by the American Psychiatric Association, 1994)

Alcohol or drug addiction or dependency—Characterized by the presence of three or more of the following: tolerance (i.e., greater amounts are needed to obtain effect); withdrawal (i.e., physical illness when use stops); large amounts used over a long period; unsuccessful efforts to cut down; the time spent in obtaining the substance replaces social, occupational or recreational activities; continued use despite adverse consequences. The terms "addiction," "dependence" and "alcoholism" are interchangeable. They are characterized by impaired control over alcohol or other drug use (Source: *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV)*, published by the American Psychiatric Association, 1994)

Addiction—A dependence on a behavior or substance that a person is powerless to stop. The term has been partially replaced by the word dependence for substance abuse. Addiction has been extended, however, to include mood-altering behaviors or activities. (Source: *Encyclopedia of Medicine*)

At-risk drinking—For men: more than 14 drinks per week or more than four drinks per occasion. For women: more than seven drinks per week or more than three drinks per occasion. (Source: National Institute of Alcoholism and Alcohol Abuse)

Hazardous drinking and drug use—The World Health Organization defines "hazardous drinking" as "alcohol consumption which confers the risk of physical and/or psychological harm." Study authors applied a similar definition to hazardous drug use.

Insomnia—trouble initiating or maintaining sleep.

Sleep architecture—the percent of time spent in each of the sleep stages.

Sleep-disordered breathing—a spectrum of conditions ranging from snoring and nocturnal upper airway resistance syndrome to severe central or obstructive sleep apnea.

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