Health Reference Series

Fifth Edition

Men's Health Concerns

SOURCEBOOK

Basic Consumer Health Information about Trends and Issues in Men's Health, Including Information about Gender-Specific Health Differences, the Leading Causes of Death in Men, Reproductive and Sexual Concerns, Male-Linked Genetic Disorders, Mental Health Concerns, Alcohol and Drug Abuse, and Other Concerns of Special Significance to Men

Along with Information about the Screenings, Vaccinations, and Self-Examinations Recommended for Men, Guidelines for Nutrition, Physical Activity, Weight Control, and Other Lifestyle Choices That Affect Wellness, a Glossary of Related Terms, and a Directory of Resources for Further Help and Information

OMNIGRAPHICS

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Chapter 1

Gender-Specific Health Differences

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Section 1.1

Differences in Men's and Women's Health: An Overview

This section includes text excerpted from "Sex and Gender," *NIH News in Health*, National Institutes of Health (NIH), May 2016

Sex and Gender

How Being Male or Female Can Affect Your Health

Are you male or female? The answer to this seemingly simple question can have a major impact on your health. While both sexes are similar in many ways, researchers have found that sex and social factors can make a difference when it comes to your risk for disease, how well you respond to medications, and how often you seek medical care. That's why scientists are taking a closer look at the links between sex, gender, and health.

Many people use the words sex and gender interchangeably, but they're distinct concepts to scientists.

Defining Differences: Sex is biological. It's based on your genetic makeup. Males have one X and one Y chromosome in every cell of the body. Females have two X chromosomes in every cell. These cells make up all your tissues and organs, including your skin, heart, stomach, muscles, and brain.

Gender is a social or cultural concept. It refers to the roles, behaviors, and identities that society assigns to girls and boys, women and men, and gender-diverse people. Gender is determined by how we see ourselves and each other, and how we act and interact with others. There's a lot of diversity in how individuals and groups understand, experience, and express gender. Because gender influences our behaviors and relationships, it can also affect health.

Influences on Health: "Sex and gender play a role in how health and disease affect individuals. There was a time when we studied men and applied those findings to women, but we've learned that there

are distinct biological differences between women and men," explains Dr. Janine Austin Clayton, who heads research on women's health at NIH. "Women and men have different hormones, different organs, and different cultural influences—all of which can lead to differences in health."

As scientists learn more about the biology of males and females, they're uncovering the influences of both sex and gender in many areas of health.

For instance, women and men can have different symptoms during a heart attack. For both men and women, the most common heart attack symptom is chest pain or discomfort. But women are more likely than men to have shortness of breath, nausea and vomiting, fatigue, and pain in the back, shoulders, and jaw. Knowing about such differences can lead to better diagnoses and outcomes.

Men and women also tend to have different responses to pain. NIH-funded researchers recently learned that different cells in male and female mice drive pain processing.

"Without studying both sexes, we wouldn't know if we're taking steps in the right direction toward appropriate clinical treatment for men and women," Clayton says. "Our differences also affect how we respond to medications, as well as which diseases and conditions we may be prone to and how those diseases progress in our bodies." For example, women metabolize nicotine faster than men, so nicotine replacement therapies can be less effective in women.

Attention to Addiction: Scientists are finding that addiction to nicotine and other drugs is influenced by sex as well. "When it comes to addiction, differences in sex and gender can be found across the board," says Dr. Sherry McKee, lead researcher at an NIH-funded center at Yale University that studies treatments for tobacco dependence. "There are different reasons men and women pick up a drug and keep using a drug, and in how they respond to treatment and experience relapse. Sex also influences disease risk in addiction. For example, women who smoke are more susceptible to lung and heart disease than men who smoke."

One NIH-funded research team has detected some of these differences in the brain. In a recent study, 16 people who smoke—8 men and 8 women—underwent brain scans while smoking to create "movies" of how smoking affects dopamine, the chemical messenger that triggers feelings of pleasure in the brain.

These brain movies showed that smoking alters dopamine in the brain at different rates and in different locations in males and females.

Dopamine release in nicotine-dependent men occurred quickly in a brain area that reinforces the effect of nicotine and other drugs. Women also had a rapid response, but in a different brain region—the part associated with habit formation. "We were able to pinpoint a different brain response between male and female smokers, a finding that could be useful in developing sex-specific treatments to help smokers quit," says lead study researcher Dr. Kelly Cosgrove, a brain-imaging expert at Yale University.

Finding better ways to help men and women quit smoking is important for everyone's health. More than 16 million Americans have diseases caused by smoking. It's the leading cause of preventable death in the U.S.

Autoimmune Disorders: Scientists have found sex influences in autoimmune disorders as well. About 80% of those affected are women. But autoimmune conditions in men are often more severe. For instance, more women than men get multiple sclerosis (MS), a disease in which the body's immune system attacks the brain and spinal cord. But men seem more likely to get a progressive form of MS that gradually worsens and is more challenging to treat.

"Not only are women more susceptible to MS, but women also have many more considerations in the management of the disease, especially since it often begins during child-bearing years," says Dr. Ellen Mowry, a specialist who studies MS at Johns Hopkins University.

"There are a lot of unanswered questions when it comes to the study of sex differences in MS and other autoimmune disorders," Mowry explains. "Researchers can learn a lot by studying women and men separately and together, considering possible risk or predictive factors that may differ based on sex or gender, and working collaboratively with other scientists to improve the likelihood of detecting these factors."

Section 1.2

Why Women Live Longer than Men

"Why Women Live Longer than Men," © 2017 Omnigraphics.
Reviewed August 2016.

According to statistics compiled by the United Nations, women typically live 4.5 years longer than men worldwide. In 2013 the global average life expectancy for women was 71 years compared to 66.5 for men. This pattern has been observed in every country in the world, and it has held true the entire time that reliable birth and death records have existed.

Although social and lifestyle factors are believed to play a role in adult mortality rates, evidence suggests that biological and genetic factors are also involved. Significantly, studies have found gender-related differences in life expectancy among other primates—female gorillas, chimpanzees, and orangutans consistently outlive males of their species as well. By studying the various factors that may account for increased female longevity, scientists hope that they will identify ways to help both men and women live longer, healthier lives.

Biological Factors

Biologists have put forth a number of theories to explain why women live longer than men. Some of the major genetic and biological factors they believe may contribute to increased female longevity include the following:

- **Women carry two X chromosomes, while men have one X and one Y chromosome.**

  This biological difference means that men are more vulnerable to genetic mutations that can cause life-threatening health conditions. Whereas women may avoid the expression of genetic diseases by relying on a normal gene on the other X chromosome, men lack a second copy of the defective gene.

- **Women's bodies tend to be smaller in size than men's bodies.**

Since larger people have more cells in their bodies, they may have a greater tendency to develop harmful cellular mutations. In addition, larger bodies use more energy, which creates wear and tear on organs and tissues and may increase the rate of long-term damage.

- **Women's immune system function declines at a slower rate than men's.**

  All people's immune function gradually declines with age. But blood samples of healthy people have shown that the normal loss of white blood cells—which help protect the body from infection—occurs faster in men than in women. As a result, women may enjoy protection from illness to a more advanced age.

- **The male hormone testosterone may increase disease risk later in life.**

  Testosterone, which is secreted by the testicles, is the hormone primarily responsible for the development of male sex traits, such as deep voices and hairy chests. Although testosterone contributes to male strength and virility, it may also increase men's risk of developing cardiovascular disease and cancer later in life. A modern analysis of records from nineteenth-century Korea revealed that eunuchs (men whose testicles are removed before puberty, and thus have significantly lower lifetime exposure to testosterone) lived an average of 20 years longer than typical Korean men and were far more likely to reach their hundredth birthday.

- **The female hormone estrogen may decrease disease risk later in life.**

  Estrogen, which is produced in the ovaries, is the hormone primarily responsible for female sex traits, such as breast development and menstruation. In contrast to testosterone, estrogen appears to protect against disease. Estrogen has antioxidant properties, meaning that it helps eliminate harmful chemicals that may cause cell damage. Studies have shown that when the ovaries are removed from female animals, the animals experience an increase in disease risk and a decrease in longevity.

- **Women develop heart disease a decade later than men.**

  Heart disease is the leading cause of death for both men and women in the United States. But partly due to the protective

effects of estrogen, which helps control cholesterol and prevent plaque formation in the arteries, women tend to develop heart disease ten years later than men. In fact, women's risk of heart disease only begins to increase after menopause, when the production of estrogen declines. In addition, more than four times as many men as women smoke worldwide, and smoking is a major contributor to heart disease. Another theory to explain the delayed onset of cardiovascular illness in women is that women's heart rate tends to increase during the second half of the menstrual cycle. Some researchers claim that this increase offers the same health benefits as moderate exercise.

Lifestyle Factors

In addition to biological differences between men and women, studies have also suggested that sociological and lifestyle factors may contribute to women's longer lifespan. Some of the main factors that are believed to influence mortality rates include the following:

- **Men are more prone to risk-taking behavior.**

  According to the U.S. Centers for Disease Control and Prevention (CDC), unintentional injuries are the third-leading cause of death for American men. For women, on the other hand, unintentional injuries rank sixth. Scientists point out that the frontal lobe of the brain develops more slowly in males than in females. Since this part of the brain is involved in calculating risks and behaving responsibly, men are more likely to exhibit dangerous or risky behavior than women of the same age. As a result, studies show that men are less likely to wear seatbelts and more likely to drive aggressively and be involved in motor vehicle accidents.

- **Women have stronger social networks.**

  Men are often socialized to hide their emotions and keep their concerns bottled up inside. For women, however, it is more culturally acceptable to express emotions and confide in friends or family members about sources of worry or stress. Studies have shown that strong social connections can decrease a person's risk of dying by 50%. Men can experience the protective nature of social ties by getting married—studies have also shown that married men tend to be healthier and live longer than single men.

- **Women take better care of their health.**

  Another contributing factor to women's longevity is that they tend to take better care of their health. Men often ignore or deny symptoms of illness and avoid seeking medical attention. In fact, studies have shown that men are 24% less likely than women to have visited a doctor within the past year.

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Section 1.3

Alcohol Use and Risks to Men's Health

This section contains text excerpted from the following sources: Text beginning with the heading "Alcohol Use and Your Health" is excerpted from "Fact Sheets—Alcohol Use and Your Health," Centers for Disease Control and Prevention (CDC), June 29, 2016; Text beginning with the heading "Excessive Alcohol Use and Risks to Men's Health" is excerpted from "Fact Sheets—Excessive Alcohol Use and Risks to Men's Health," Centers for Disease Control and Prevention (CDC), March 7, 2016.

Alcohol Use and Your Health

Drinking too much can harm your health. Excessive alcohol use led to approximately 88,000 deaths and 2.5 million years of potential life

lost (YPLL) each year in the United States from 2006–2010, shortening the lives of those who died by an average of 30 years. Further, excessive drinking was responsible for 1 in 10 deaths among working-age adults aged 20–64 years. The economic costs of excessive alcohol consumption in 2010 were estimated at $249 billion, or $2.05 a drink.

What Is a "Drink"?

In the United States, a standard drink contains 0.6 ounces (14.0 grams or 1.2 tablespoons) of pure alcohol. Generally, this amount of pure alcohol is found in

- 12-ounces of beer (5% alcohol content).
- 8-ounces of malt liquor (7% alcohol content).
- 5-ounces of wine (12% alcohol content).
- 1.5-ounces of 80-proof (40% alcohol content) distilled spirits or liquor (e.g., gin, rum, vodka, whiskey).

What Is Excessive Drinking?

Excessive drinking includes binge drinking, heavy drinking, and any drinking by pregnant women or people younger than age 21.

Binge drinking, the most common form of excessive drinking, is defined as consuming

- For women, 4 or more drinks during a single occasion.
- For men, 5 or more drinks during a single occasion.

Heavy drinking is defined as consuming

- For women, 8 or more drinks per week.
- For men, 15 or more drinks per week.

Most people who drink excessively are not alcoholics or alcohol dependent.

What Is Moderate Drinking?

The *Dietary Guidelines for Americans* defines moderate drinking as up to 1 drink per day for women and up to 2 drinks per day for men. In addition, the *Dietary Guidelines* do not recommend that individuals who do not drink alcohol start drinking for any reason.

However, there are some people who should **not** drink any alcohol, including those who are:

- Younger than age 21.
- Driving, planning to drive, or participating in other activities requiring skill, coordination, and alertness.
- Taking certain prescription or over-the-counter medications that can interact with alcohol.
- Suffering from certain medical conditions.
- Recovering from alcoholism or are unable to control the amount they drink.

By adhering to the *Dietary Guidelines*, you can reduce the risk of harm to yourself or others.

Short-Term Health Risks

Excessive alcohol use has immediate effects that increase the risk of many harmful health conditions. These are most often the result of binge drinking and include the following:

- Injuries, such as motor vehicle crashes, falls, drownings, and burns.
- Violence, including homicide, suicide, sexual assault, and intimate partner violence.
- Alcohol poisoning, a medical emergency that results from high blood alcohol levels.
- Risky sexual behaviors, including unprotected sex or sex with multiple partners. These behaviors can result in unintended pregnancy or sexually transmitted diseases, including HIV.

Long-Term Health Risks

Over time, excessive alcohol use can lead to the development of chronic diseases and other serious problems including:

- High blood pressure, heart disease, stroke, liver disease, and digestive problems.
- Cancer of the breast, mouth, throat, esophagus, liver, and colon.
- Learning and memory problems, including dementia and poor school performance.

- Mental health problems, including depression and anxiety.
- Social problems, including lost productivity, family problems, and unemployment.
- Alcohol dependence, or alcoholism.

By not drinking too much, you can reduce the risk of these short- and long-term health risks.

Excessive Alcohol Use and Risks to Men's Health

Men are more likely than women to drink excessively. Excessive drinking is associated with significant increases in short-term risks to health and safety, and the risk increases as the amount of drinking increases. Men are also more likely than women to take other risks (e.g., drive fast or without a safety belt), when combined with excessive drinking, further increasing their risk of injury or death.

Drinking Levels among Men

- Approximately 58% of adult men report drinking alcohol in the last 30 days.
- Approximately 23% of adult men report binge drinking 5 times a month, averaging 8 drinks per binge.
- Men are almost two times more likely to binge drink than women.
- Most (90%) people who binge drink are not alcoholics or alcohol dependent.
- About 4.5% of men and 2.5% of women met the diagnostic criteria for alcohol dependence in the past year.

Injuries and Deaths as a Result of Excessive Alcohol Use

Men consistently have higher rates of alcohol-related deaths and hospitalizations than women.

Among drivers in fatal motor-vehicle traffic crashes, men are almost twice as likely as women to have been intoxicated (i.e., a blood alcohol concentration of 0.08% or greater).

Excessive alcohol consumption increases aggression and, as a result, can increase the risk of physically assaulting another person.

Men are more likely than women to commit suicide, and more likely to have been drinking prior to committing suicide.

Reproductive Health and Sexual Function

Excessive alcohol use can interfere with testicular function and male hormone production resulting in impotence, infertility, and reduction of male secondary sex characteristics such as facial and chest hair.

Excessive alcohol use is commonly involved in sexual assault. Also, alcohol use by men increases the chances of engaging in risky sexual activity including unprotected sex, sex with multiple partners, or sex with a partner at risk for sexually transmitted diseases.

Cancer

Alcohol consumption increases the risk of cancer of the mouth, throat, esophagus, liver, and colon in men.

There are a number of health conditions affected by excessive alcohol use that affect both men and women.

Section 1.4

Gender Differences in Heart Disease

This section contains text excerpted from the following sources: Text beginning with the heading "Facts about Heart Disease" is excerpted from "Know the Facts about Heart Disease," Centers for Disease Control and Prevention (CDC), March 2010. Reviewed August 2016; Text beginning with the heading "Facts on Men and Heart Disease" is excerpted from "Men and Heart Disease Fact Sheet," Centers for Disease Control and Prevention (CDC), June 16, 2016.

Facts about Heart Disease

What Is Heart Disease?

Heart disease is the leading cause of death in the United States. More than 600,000 Americans die of heart disease each year. That's one in every four deaths in this country.

The term "heart disease" refers to several types of heart conditions. The most common type is coronary artery disease, which can cause

heart attack. Other kinds of heart disease may involve the valves in the heart, or the heart may not pump well and cause heart failure. Some people are born with heart disease.

Are You at Risk?

Anyone, including children, can develop heart disease. It occurs when a substance called plaque builds up in your arteries. When this happens, your arteries can narrow over time, reducing blood flow to the heart.

Smoking, eating an unhealthy diet, and not getting enough exercise all increase your risk for having heart disease.

Having high cholesterol, high blood pressure, or diabetes also can increase your risk for heart disease. Ask your doctor about preventing or treating these medical conditions.

What Are the Signs and Symptoms?

The symptoms vary depending on the type of heart disease. For many people, chest discomfort or a heart attack is the first sign.

Someone having a heart attack may experience several symptoms, including:

- Chest pain or discomfort that doesn't go away after a few minutes.
- Pain or discomfort in the jaw, neck, or back.
- Weakness, light-headedness, nausea (feeling sick to your stomach), or a cold sweat.
- Pain or discomfort in the arms or shoulder.
- Shortness of breath.

If you think that you or someone you know is having a heart attack, call 9-1-1 immediately.

How Is Heart Disease Diagnosed?

Your doctor can perform several tests to diagnose heart disease, including chest X-rays, coronary angiograms, electrocardiograms (ECG or EKG), and exercise stress tests. Ask your doctor about what tests may be right for you.

Can It Be Prevented?

You can take several steps to reduce your risk for heart disease:

- Don't smoke.
- Maintain a healthy weight.
- Eat a healthy diet.
- Exercise regularly.
- Prevent or treat your other health conditions, especially high blood pressure, high cholesterol, and diabetes.

How Is It Treated?

If you have heart disease, lifestyle changes, like those just listed, can help lower your risk for complications. Your doctor also may prescribe medication to treat the disease. Talk with your doctor about the best ways to reduce your heart disease risk.

Facts on Men and Heart Disease

- Heart disease is the leading cause of death for men in the United States, killing 321,000 men in 2013—that's **1 in every 4** male deaths.
- Heart disease is the **leading cause** of death for men of most racial/ethnic groups in the United States, including African Americans, American Indians or Alaska Natives, Hispanics, and whites. For Asian American or Pacific Islander men, heart disease is second only to cancer.
- About 8.5% of all white men, 7.9% of black men, and 6.3% of Mexican American men have coronary heart disease.
- **Half** of the men who die suddenly of coronary heart disease have **no previous symptoms**. Even if you have no symptoms, you may still be at risk for heart disease.
- **Between 70% and 89%** of sudden cardiac events occur in men.

Risk Factors

High blood pressure, high LDL cholesterol, and smoking are key risk factors for heart disease. About **half of Americans** (49%) have at least one of these three risk factors.

Several other medical conditions and lifestyle choices can also put people at a higher risk for heart disease, including:

- diabetes
- overweight and obesity
- poor diet
- physical inactivity
- Excessive alcohol use

Section 1.5

Gender Differences in Substance Abuse

This section includes text excerpted from "Gender Differences in Primary Substance of Abuse across Age Groups," Substance Abuse and Mental Health Services Administration (SAMHSA), April 3, 2014.

National data consistently show that gender is an important factor to consider when examining patterns of substance abuse, such as overall prevalence rates and substances of choice. For example, males are more likely than females to report marijuana and alcohol use, whereas females are more likely than males to report nonmedical use of prescription drugs. Also, differences in substance abuse patterns among men and women vary by age. Data from the 2011 National Survey on Drug Use and Health show that men aged 18 or older have almost twice the rate of substance dependence as adult women, but among youths aged 12 to 17, the rate of substance dependence for both genders is the same (6.9 percent). Knowledge of how gender can interact with age and patterns of substance abuse may be useful to those responsible for the design of outreach, prevention, and treatment programs.

The Treatment Episode Data Set (TEDS) collects data on admissions to substance abuse treatment facilities across the United States and can be used to examine differences in primary substance of abuse among males and females by age. TEDS collects information on up to three substances of abuse that led to the treatment episode. The main substance abused by the

client is known as the "primary substance of abuse." For each admission, data on primary substance of abuse are reported at the time of treatment entry. The analyses in this report are based on TEDS data for 2011.

TEDS is a census of all admissions to treatment facilities reported to the Substance Abuse and Mental Health Services Administration (SAMHSA) by State substance abuse agencies. Because TEDS involves actual counts rather than estimates, statistical significance and confidence intervals are not applicable. The differences mentioned in the text of this report have Cohen's h effect size ≥ 0.20, indicating that they are considered to be meaningful

Overview and Demographic Characteristics

In 2011, about 609,000 of the 1.84 million admissions to substance abuse treatment were female (33.1 percent), and 1.23 million were male (66.9 percent). No meaningful gender differences were found by race/ ethnicity. Specifically, the majority of female and male admissions (66.4 and 58.2 percent, respectively) were non-Hispanic White. The percentages of female and male admissions that were non-Hispanic Black and Hispanic were similar.

Gender Profiles

No appreciable gender differences were found by primary substances of abuse overall (Figure 1.1). Alcohol was the most commonly reported primary substance of abuse by female (33.3 percent) and male (42.3 percent) admissions. Among females, alcohol was followed by heroin (15.3 percent), marijuana (14.6 percent), and prescription pain relievers (13.8 percent); among males, the next most frequently reported substances were marijuana (19.9 percent), heroin (15.0 percent), and prescription pain relievers (7.8 percent).

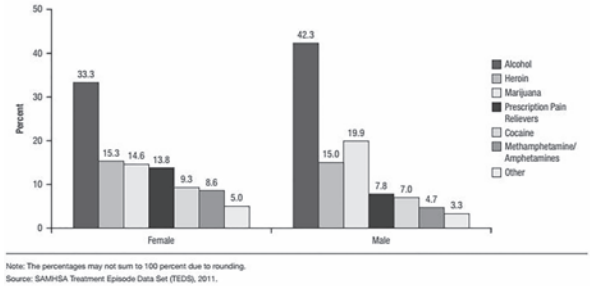

Figure 1.1. *Substance Abuse Treatment Admissions Aged 12 or Older, by Gender and Primary Substance*

Differences in Primary Substance of Abuse

Analyses by gender and age were conducted for the six most commonly reported primary substances of abuse: alcohol, marijuana, heroin, prescription pain relievers, cocaine, and methamphetamine/amphetamines. Four of these substances (the exceptions were cocaine and heroin) showed meaningful gender difference (Cohen's $h \geq .20$) in at least one age group.

Alcohol and Marijuana

Compared with their male counterparts, a larger proportion of female admissions aged 12 to 17 reported alcohol as their primary substance of abuse (21.7 vs. 10.5 percent). This pattern changed among adult admissions. Among admissions aged 25 to 34, a smaller proportion of female admissions than male admissions reported alcohol as their primary substance of abuse (25.9 vs. 36.5 percent). Marijuana was reported as the primary substance of abuse less frequently by females than males among admissions aged 12 to 17 (60.8 vs. 80.7 percent) and 18 to 24 (22.1 vs. 33.4 percent). There was no variation by gender in primary marijuana abuse among admissions aged 25 or older.

Methamphetamine/Amphetamines

The proportions of female and male admissions reporting methamphetamine/amphetamines as their primary substance of abuse were similar across all age groups with the exception of those aged 18 to 24. Specifically, among admissions aged 18 to 24, 8.9 percent of female admissions reported primary methamphetamine/amphetamine abuse compared with 3.7 percent of male admissions.

Prescription Pain Relievers

The highest proportions of primary abuse of prescription pain relievers (e.g., oxycodone) were found among admissions aged 18 to 24 and 25 to 34. In the 25 to 34 age group, 19.0 percent of female admissions and 12.2 percent of male admissions reported prescription pain relievers as their primary substance of abuse. In terms of the effect size, however, the differences between male and female admissions in these age groups were negligible. The only meaningful difference by effect size between males and females was observed among admissions aged 65 or older. Within the 65 or older age group, the proportion of female

admissions reporting primary abuse of prescription pain relievers was nearly 3 times that of their male counterparts (7.2 vs. 2.8 percent).

Discussion

This report highlights important differences in primary substance of abuse between males and females admitted to substance abuse treatment. These differences were found at various stages of life, from adolescence through older adulthood, particularly for abuse of alcohol, marijuana, methamphetamine/amphetamines, and prescription pain relievers. Although this report does not explain the potential reasons for these differences, it brings awareness to the fact that they exist. This may help inform the design of prevention, outreach, and treatment services for specific gender and age groups across multiple settings, including primary care. For example, other research shows that compared with men, women have been found to initiate use of methamphetamine at younger ages and have a greater vulnerability to methamphetamine dependence due to physiological factors. This research, coupled with the findings in this report, might suggest that age-appropriate methamphetamine prevention and outreach efforts directed towards adolescents and young women in particular may be important in areas with moderate to high rates of methamphetamine use.

Additionally, the findings related to differences in the abuse of prescription pain relievers between older adult males and females may warrant further investigation particularly in the context of older adults receiving medications in general medical settings. Further research is needed to understand who would benefit from programs that target particular gender and age groups compared with gender-specific programs and standard treatment.

Section 1.6

PTSD Study: Men versus Women

This section includes text excerpted from "PTSD Study: Men versus Women," U.S. Department of Veterans Affairs (VA), April 18, 2013. Reviewed August 2016.

"In the general population, women are twice as likely as men to develop posttraumatic stress disorder," noted Dr. Sonja Batten, VA's Deputy Chief Consultant for Specialty Mental Health. "But among recent returnees seeking care at VA, PTSD rates among men and women are the same. Statistics such as these suggest the need to better understand the role of gender in PTSD, particularly as it may impact our Veterans seeking care."

Researchers at the Department of Veterans Affairs are now taking some initial steps toward understanding this complex subject. To that end, Dr. Sabra Inslicht, a staff psychologist at the San Francisco VA Medical Center and an assistant professor of psychiatry at the University of California, San Francisco recently led a VA study that took a closer look at how men and women learn to fear. Her work was published in the October 2012 issue of the Journal of Psychiatric Research.

Men Are from Mars; Women Are from Venus

"If we can learn more about potential gender differences in the process of fear learning," Inslicht said, "it may help us develop more targeted treatments that are geared more precisely to the unique needs of men and women."

For their study, Inslicht and her team recruited 18 men and 13 women who had been diagnosed with PTSD. These participants were all shown various images on a computer screen. Electrodes were attached to their palms so researchers could measure participants' physiological response to each image.

After certain images appeared, the test subject received a small electrical shock. Gradually, the test subject came to associate these particular images with something unpleasant.

"They learned to anticipate the impending shock," Inslicht said. "They learned the danger cues. We call this 'fear conditioning.'"

Researchers carefully monitored test subjects' skin conductive responses—that is, how sweaty their palms got—to measure the body's stress reaction to the image on the screen.

"We discovered that women responded more strongly to the visual cues than men when they saw a particular image that they knew was going to be followed by an electric shock," Inslicht explained. "This suggests that women conditioned more robustly than men. In our future work, we'd like to get a better understanding as to why these differences may occur."

Fight or Flight

"To some extent, learning to fear is important for survival," the researcher said. "When we are threatened by something dangerous, we tend to react with a stress response or 'fight-or-flight' response. It helps keep us safe by mobilizing our bodies to either fight or flee a threat, thus enabling us to protect ourselves from harm in dangerous situations."

Inslicht said this 'fight or flight' response, however, can sometimes persist even in non-threatening situations.

"For example," she said, "if you witnessed a suicide bombing while on patrol in a crowded marketplace in Afghanistan, you might develop a fear of crowded places. While you're on patrol and in potential danger, a heightened level of vigilance can be protective. However, if that response persists even after returning home and to a safe place, it can become problematic.

"When you're unable to turn it off in safe situations, the stress becomes prolonged," she continued. "This can cause wear and tear on both the mind and the body. When this heightened reactivity starts to negatively impact your daily life, we begin to worry about posttraumatic stress."

But if fear conditioning does, in fact, occur differently in men and women, then might not the process known as 'fear extinction' also be affected by gender differences?

"Fear extinction happens," Inslicht said, "when you are gradually exposed to the previously learned danger cues, such as crowds, and you gradually come to realize that the cue will not be followed by a stressful or potentially traumatic event. This results in the diminishing of the fear response. Since extinction learning is believed to be important for recovery from PTSD, a deeper understanding of this process could alter our strategy for how we treat PTSD in men and women."

Much More to Learn

Inslicht said her small study leaves a number of questions unanswered, and that more in-depth research is needed.

"For example, all our study participants had PTSD," she said, "so we couldn't arrive at any conclusions regarding whether women, as a general rule, condition more strongly than men do, or whether this difference is found only among women who have already developed PTSD."

"Finally, we did not examine what may drive the gender differences that we found," the researcher noted. "For example, there may be biological differences such as particular hormones and neuropeptides that may mediate these effects."

Inslicht said the research community is only just beginning to understand fear learning and extinction mechanisms and their relationship to PTSD.

"Ultimately, however, this line of research may result in advances for treatment," she concluded. "There may be ways that we can enhance extinction learning—perhaps through medications or with other modifications to existing behavioral treatments."