# Alcoholism

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## Abstract

This article attempts to provide the reader with a better understanding of the disease of alcoholism. In addition to reviewing the health consequences and social implications of the disease, this review examines the development of the disease theory of alcoholism, the paradigm shift in Western culture's understanding and treatment of the disease, and highlights the treatment and recovery options available today to the alcoholic seeking help. Section One generally describes the disease of alcoholism, the physical effects of alcohol, the development and progression of alcohol dependence, suggested causes of alcoholism, and health consequences associated with heavy drinking. Section Two discusses the prevalence of alcoholism and its social effects. Section Three describes the development of the disease theory of alcoholism and discusses the change over time in social attitudes and perspectives towards this disease. Section Four describes genetic research currently being conducted in the field of alcoholism study and considers the implications of the findings that this research provides. Section Five discusses different treatment approaches to the disease of alcoholism and various recovery options that are available to an alcoholic seeking help.

# Alcoholism

*A GENERAL OVERVIEW OF ALCOHOLISM AND VARIOUS IMPLICATIONS*

Alcoholism is a common, chronic, often progressive disorder that has serious negative consequences not only for the affected individual, but also for society. Alcoholism has serious health consequences and is responsible annually for a large number of deaths from alcohol-related diseases, accidents, and homicides. Current research suggests that nearly 100,000 Americans die annually as a result of alcohol abuse (Vogin, 2002). Alcohol abuse is also a significant factor in a number of social problems including criminal behavior. Estimates indicate alcohol as a factor in more than half of the country's traffic accidents, homicides and suicides (Vogin). People who suffer from this illness are known as alcoholics. They cannot control their drinking even when it becomes the underlying cause of serious harm, including medical disorders, marital difficulties, job loss, or automobile crashes. Medical science has yet to identify the exact cause of alcoholism, but research suggests that it has a genetic basis and that psychological, social, and environmental factors influence its development (Vogin). Alcoholism cannot be cured yet, but various treatment options can help an alcoholic avoid drinking and regain a healthy life.

Alcohol dependence develops differently in each individual, but is characterized by certain common symptoms that separate alcoholics from "normal drinkers," according to the National Institute on Alcohol Abuse and Alcoholism (NIAAA), a United States government agency that is part of the National Institutes of Health. Alcoholics develop a craving, or a strong urge, to drink despite awareness that drinking is creating problems in their lives. As their tolerance increases, they need to drink increasing amounts of alcohol in order to reach intoxication. In addition, they suffer from impaired control, an inability to stop drinking once they have begun. Their physical dependence upon alcohol is such that when they stop drinking after a period of heavy alcohol use, they suffer withdrawal symptoms, which include nausea, sweating, shakiness, anxiety, delirium, grand mal seizures, and even death. The World Health Organization (WHO) notes that other behaviors common in people who are alcohol dependent include their seeking out opportunities to drink alcoholic beverages (often to the exclusion of other activities) and rapid return to their former drinking patterns following periods of abstinence. These features of drinking patterns and reactions in such individuals are what

distinguish alcoholics from non-alcoholics and have led medical scientists to believe that alcoholism is a progressive and often fatal disease.

*Physical Effects of Alcohol*

Ethyl alcohol, or ethanol, is present in varying amounts in different alcoholic beverages from beer or wine to distilled liquors such as whiskey, gin, and rum. When a person consumes alcohol, it is rapidly absorbed into the bloodstream, travels throughout the entire body, and affects nearly every tissue. Moderate and high doses of alcohol impair the functions of the central nervous system. The higher the alcohol level is in the blood, the greater the impairment. As the blood passes through the liver, enzymes break down the alcohol into harmless byproducts, which are eliminated from the body six to eight hours later. In alcoholics, oftentimes the rate of ingestion exceeds the rate of elimination, thus raising the blood alcohol level and resulting in intoxication (Hewitt & Gordis, 2001).

While small amounts of alcohol may relieve tension or fatigue, increase appetite, or produce an anesthetic effect, larger quantities inhibit or impair higher thought processes, often producing euphoria, and reducing inhibition, anxiety, and guilt. As a person becomes intoxicated, their inhibitions become lessened and, as drinking progresses, their speech may become loud and slurred. Impaired judgment may lead to incautious behavior, and physical reflexes and muscular coordination may become noticeably affected. Non-alcoholics may experience dysphoria (i.e., unpleasant feelings) and stop drinking at this point. Alcoholic individuals, however, may continue to drink in spite of such feelings (Peele, in D.A. Ward (Ed.), 1990). If drinking continues, complete loss of physical control follows, ending in stupor, and possibly death. One paradox with an alcoholic's drinking patterns as a response to relieve anxiety, depression or other emotional distress is that they continue to show these problems after drinking, often in quite severe form. Studies have indicated that alcoholics who drink in response to depression and anxiety actually show greater anxiety and depression after drinking (Peele, 1990). Here we see that while drinking to relieve emotional stress may provide acute relief for the drinker, it may also result in the possible development of more severe emotional disabilities that perpetuate the individual's alcohol dependence. It seems that drinking creates a vicious cycle for these alcoholics, which reinforces and potentially exacerbates their drinking and emotional problems (Peele, 1990).

*The Development of Alcohol Dependence*

Once begun, alcoholism typically progresses over 10-20 years (Blondelle, Frierson & Lippmann, 1996). Health professionals typically describe three general stages to characterize this progression. Each stage is defined by a set of symptoms that can be used by the treating physician in early diagnosis and treatment of alcoholism. These stages are: (1) social drinking, (2) problem drinking and (3) alcohol dependence. Most individuals who drink alcohol never progress beyond Stage One, and are commonly known as "social drinkers." In this stage, individuals drink alcohol primarily as an accompaniment to social situations and alcohol consumption is not the central focus of their activities (Hewitt & Gordis, 2001).

A small percentage of social drinkers may progress to Stage Two. During this stage, drinking begins to cause problems that may increase in severity over time with continued heavy drinking, although they may not show any signs of physical illness. Signs of Stage Two progression usually include an increase in alcohol consumption that begins to interfere with other activities. As problem drinking progresses, the alcoholic's intoxicated behavior may become disagreeable and antisocial. Such a person may resort to drinking to relieve the physical discomfort of withdrawal symptoms. During this phase, one may take up "morning drinking" in an attempt to offset uncomfortable symptoms of a "hangover" that may have developed after heavy drinking the night before (Hewitt & Gordis, 2001).

During Stage Two, one may or may not be alcohol dependent, as dependence is subtle, slow and progressive. As alcohol dependence develops, the person is often unable to acknowledge that drinking and intoxication have become goals in and of themselves. Drinking may become a coping mechanism for dealing with problems, and hence, justifiable to the user (although many of such problems may have been brought about by the heavy alcohol use in the first place). In addition, these heavy drinkers may neglect familial responsibilities and decline in their productivity at work. Many alcoholics develop a psychological condition known as denial, where they are unable to acknowledge that alcohol use lies at the root of many of their problems, which furthers the progression of the disease. Denial was long thought to be a personality trait shared by all persons who suffer from alcohol-use disorders. Despite their claim that they can quit drinking at their own discretion, in actuality, many problem drinkers find it increasingly difficult to moderate their alcohol consumption as time progresses, despite their illusion of control (Hewitt & Gordis, 2001).

These factors over time lead to stage three, the ultimate stage of alcohol dependence. In addition to suffering from many of the problems experienced by individuals in stage two, an individual who has progressed to stage three can no longer control his or her drinking. This impaired control, in which the compulsion to drink is further exacerbated, is the primary means by which health professionals may diagnose people who have progressed to alcohol dependence (Hewitt & Gordis, 2001).

*Causes*

The etiology of alcoholism is unknown, but strong evidence exists for a genetic origin (Devor & Cloninger, 1989), although clearly psychological, social, and environmental factors influence its expression and may perpetuate its development as well (Hewitt & Gordis, 2001). Environmental factors and social factors that may affect the development of the disease include personal behavioral skills, peer influences early in life, parental behavior, social and cultural attitudes toward alcohol use, stress, and availability of alcoholic beverages. Once a person has established a drinking pattern, social and environmental factors combined with physical and psychological changes induced by heavy drinking may perpetuate the continued use of alcohol among alcoholic individuals (Hewitt & Gordis, 2001).

*Health Consequences*

While some studies have found that moderate use of alcohol has beneficial health effects, including protection from coronary heart disease, heavy and prolonged intake of alcohol can seriously disturb body chemistry. Heavy drinkers lose their appetite and tend to obtain calories from alcohol rather than from ordinary foods. While alcohol is rich in calories and can provide substantial amounts of energy, if it constitutes the primary source of calories in place of food, the body will lack vitamins, minerals, and other essential nutrients (Hewitt & Gordis, 2001).

In addition, prolonged use of large amounts of alcohol may cause serious liver damage. In the first stage of liver disease, usually caused by excessive alcohol consumption, fat accumulates in the liver (also known as “fatty liver”) whereby complications leading to hepatitis or cirrhosis may develop. Such heavy drinking may also damage heart muscle as nearly half of all cases of cardiomyopathy, a potentially fatal heart disease, are caused by alcohol abuse. Alcoholics also tend to have higher levels of the hormone epinephrine in the blood along with deficiencies of the mineral magnesium. This combination produces severe arrhythmias, or heartbeat irregularities, a common cause of sudden death in heavy drinkers. In addition, chronic

drinkers typically develop hypertension, a leading cause of stroke. A particularly common feature of alcoholism is "blackout" drinking, where the person cannot consciously recall events or his behavior during such a blackout state of intoxication. Some such blackouts may last for a period of several hours or up to several days (Hewitt & Gordis, 2001).

Clinical psychologist J.R. Milam (1992) suggests, three phases of progressive brain impairments that participate in personal and character transformation in the alcoholic that augment the strength of their emotions and of their addiction. These phases are briefly described as follows: (1) Between drinking episodes, all brain cells are in a toxic, malnourished state. Their detoxification and stabilization takes several weeks of total abstinence from alcohol and all other drugs. If heavy drinking continues, (2) billions of brain cells are damaged, such that repair and healing takes several months of abstinence. Chronic alcoholics often reach the point where (3) many millions of brain cells die. The loss is permanent, but during a period of some four years of total abstinence, surviving brain cells compensate for those that are lost (Milam).

The strong physical component of alcohol addiction becomes even more evident when the alcoholic tries to stop drinking. In some cases, alcohol withdrawal may lead to delirium tremens (DTs), which produce confusion, sleeplessness, depression, and terrifying hallucinations. As the delirium progresses, a persistent and uncontrollable shaking develop, beginning with the hands that may extend to the head and body (Hewitt & Gordis, 2001).

*PREVALENCE OF ALCOHOLISM AND ITS SOCIAL EFFECTS*

Alcohol dependence affects a broad cross section of society around the world. Scientists have not identified a typical alcoholic personality, and they cannot predict with absolute certainty which drinkers will progress to alcohol dependence. While alcohol use disorders develop in a predictable pattern, some studies show that alcohol problems and their solutions differ significantly according to the age, sex and ethnicity of the individual (Seale & Muramoto, 1993). The prevalence of the illness varies in different countries. At a cultural level, addiction to a substance such as alcohol varies according to historical events and social attitudes (Blum & Blum, 1969; McClelland et al., 1972; Zinberg & Harding, 1979). Cultural variations in alcoholism rates are related to the way in which drinking is perceived of in different cultural settings. In some cultures, problem drinking is practically unknown. In rural Mediterranean societies, for example, drinking does not lead to the destructive and antisocial behavior (such as

fighting, reckless driving, blackout, sexual aggression) that seems to define alcoholism in American culture (Blum & Blum). Moderate drinking is notable in ethnic and cultural groups such as the Chinese (Barnett, 1955), the Greeks (Blum & Blum), the Jews (Glassner & Berg, 1980), and the Italians (Lolli, Serianni, Golder & Luzzato-Fegiz, 1958).

The WHO estimates that nearly 62 million people worldwide suffer from alcohol dependence, and studies estimate there are more than 15 million alcoholics in America who require treatment (Hackler, 1983). In August 1982, a Gallup poll (Alcohol Abuse, 1982) found that one-third of American families has had a problem with alcohol, a figure that had doubled over the previous 51.5 years (Peele, 1984). Although its exact prevalence has not been established, in the United States, alcoholism affects approximately 5-10% of the general population, 10-20% of ambulatory patients, and 20-40% of patients in hospital settings (Maly, 1993; Moore et al., 1989). In the United States, research shows that nearly 15 million people experience problems related to their use of alcohol. Of these, actual alcohol dependence affects about 8.1 million men and women – almost 3 percent of the population. Other research studies indicate that men are three times more likely than women to become alcoholics, while people aged 65 and older have the lowest rates of alcohol dependence (Hewitt & Gordis, 2001). In the United States, people who consume alcohol at an early age are at a higher risk for developing alcohol dependence later in life. Estimates indicate that 40 percent of people who begin to drink before age 15 will become alcohol dependent at some point in their lives, and that such individuals are four times more likely to become alcohol dependent than those who delay drinking until age 21 (Hewitt & Gordis).

Today experts characterize alcohol-use disorders as forms of illness that are so widespread that they constitute a major public health problem. According to the WHO, alcohol dependence and other alcohol-use disorders undermine global health, and account for 3.5 percent of the total cases of disease worldwide. In the United States alone, the NIAAA estimates that alcoholism causes losses of more than $185 billion a year in lost productivity, illness, and premature death. In addition, women who drink excessive amounts of alcohol while pregnant run a high risk of having a baby born with fetal alcohol syndrome (FAS), the leading known cause of birth defects, which results in a combination of mental and physical defects that may have dramatic or subtle expression in the individual (Hewitt & Gordis, 2001).

There are costly links between addiction/alcoholism and our criminal justice system as well. The vast majority of all prison inmates are incarcerated for crimes secondary to drug and alcohol addiction. The annual cost to society of tending to the multiple effects of alcoholism and addiction, including rampant "psychiatric" problems, family neglect and abuse, poverty, violence, and other crimes, illness, and organ and system failures, accidental injuries and deaths, is in the hundreds of billions of dollars (Milam, 1992). Clearly, the disease of alcoholism is not only a problem for the individual, but a problem with enormous consequences for society as well.

*THE DEVELOPMENT OF DISEASE THEORY AND CHANGE IN SOCIAL ATTITUDES*

Complications from heavy alcohol consumption have been recorded throughout history around the world. Physicians have played a role in the treatment of alcoholism since the age of Antiquity. A large amount of treatment by physicians has been well meaning, but misinformed and characterizes the complexity of understanding the disease of alcoholism. With the exception of a few physicians ahead of their time, most of society has viewed people who drink excessively as irresponsible, immoral, and of weak character. The commonplace view for centuries (and still among many of the uninformed today) held that taking or rejecting a drink was a matter of personal decision, thus all excessive drinking was considered a voluntary act and the individual, therefore, should be held responsible for his or her behavior. Thus, punishment and incarceration of drunkards was considered necessary to protect the community, an issue that we are still grappling with today. It is only within the last two centuries that research findings have determined that alcoholism is, indeed, a disease with real, neurophysiological components; these effects may render the alcoholic incapable of exercising discretion or control regarding alcohol or drug ingestion.

One of the earliest versions of the disease theory of alcoholism originated with physician Benjamin Rush, who published *An Inquiry into the Effects of Ardent Spirits on the Human Mind and Body* in 1784. Therein he chronicles the progression of alcoholism with the same level of understanding that we maintain today:

"Drunkenness is the result of a loss of willpower. Initially drinking is purely a matter of choice. It becomes a habit, and then a necessity." He also identified alcoholism as a primary disease and not a symptom of some other malady. Rush considered cold baths and total

abstinence necessary treatments to effect a cure for alcoholism, but found that such treatment methods yielded disappointing results. Since it proved almost impossible for Rush to impose his radical therapy in everyday surroundings, he proposed the construction of detoxification establishments, and asylums to provide sober housing for chronic abusers until cured (Levine, 1978).

Perhaps the greatest advances in our understanding of alcoholism as a disease came about in the 19th and 20th Centuries. At the turn of the 19th Century, English physician, Dr. Thomas Trotter was one of the first medical professionals to relate alcoholism to the increasing numbers of patients in the emerging, specialized mental hospitals, and among the first medical professionals to articulate a conception of alcoholism similar to the disease theory we have today. He wrote, "drunkenness is an illness of unknown cause which upsets the healthy equilibrium of the body." His deduction quickly caught on. In 1841, the first English life assurance company offered lower premiums to those who abstain from alcohol, thus we see the emergence of a growing awareness of the link between longevity and alcohol consumption. Doctors in English sanitariums were also quick to draw such links. In 1850, Forbes Wilson mentioned that 4 out of 5 inmates were in the asylum through overindulgence in distilled liquor (Sournia, 2000).

Throughout other parts of Western Europe during this century, respected physicians were gradually becoming convinced that alcoholism was indeed an illness. The reputable Bruhl-Cramer, a German physician, also considered heavy drinking to be a disease and used the psychiatric term 'dipsomania' to describe the disorder. He wrote: "Those affected have an abnormal, all-consuming and elemental need for alcohol." He believed that the destruction of their moral judgment was a consequence and not the cause of their sickness, and that will power alone could provide a cure. Austrian Dr. Lippich produced the first statistical evidence connecting negative health consequences as the effects of heavy alcohol consumption. He followed up two hundred drinkers for four years and established that their lives were shorter and that they had fewer children who were more prone to illness than those patients who did not drink (Sournia, 2000).

Concurrently, in America, people were also increasingly coming to view alcohol as "demon rum" and regarded uncontrolled drunkenness as an inevitable consequence of frequent, heavy drinking. The solution they proposed was national abstinence. Temperance societies in

the 19th and 20th centuries pushed for laws ranging from arrest and jail sentences for public drunkenness to prohibition of the manufacture, distribution, and consumption of alcoholic beverages. In 1920, at a point when drinking patterns had moderated substantially, national prohibition was enacted. When it was repealed in 1933, the goal of universal abstinence died with it. The disease theory became transmuted at this time to the view that chronic drunkenness was not an inherent property of alcohol, but was rather a characteristic of a small group of people with an inbred susceptibility to alcoholism (Beauchamp, 1980).

Medical Doctor Thomas L. Haynes (1988) suggests that the most notable treatments for alcoholism developed in the 19th and 20th Centuries beginning with Sigmund Freud. Although Freudian psychoanalytic theories about why people drink uncontrollably were insightful, his therapies seemed unable to keep people sober for long. Against the setting of temperance movements gaining swift momentum, he and other physicians were just becoming aware of chemical dependency as a disease and were gradually discovering more about various physical and mental complications related to heavy drinking (Haynes).

Dr. Carl Jung, one of Freud’s students, is said to be instrumental in our current understanding of alcohol dependence as a disease. He concluded, after working with many alcoholics, that alcoholism was a hopeless condition from which one could not recover without some type of spiritual conversion experience. Dr. William Silkworth coined the description of alcoholism that was adopted by Alcoholics Anonymous in 1935 as “an obsession of the mind that condemns one to drink and an allergy of the body that condemns one to die.” He estimated that his success rate with alcoholics was approximately 2% before the recovery of Bill Wilson and the founding of Alcoholics Anonymous (Haynes, 1988).

Dr. E.M. Jellinek is recognized as the premier researcher in the field of alcoholism and was strongly influential of the disease model of alcoholism that we maintain today. Dr. Haynes maintains that Jellinek’s writings and descriptions “did more for the acceptance of the disease concept of alcoholism and of A.A. as a respectable therapeutic modality than any other medical force of the time” (Haynes, 1988).

Up until these advances mid-20th century, social attitudes about alcoholism were ambivalent, as there was no strong correlative evidence that alcoholic drinking and behaviors (and all of the consequences entailed) were not just a matter of personal choice. As noted earlier, the typical picture of the alcoholic was of someone without steady employment, unable to sustain

family relationships and most likely in desperate financial straits, because of poor choices and hedonistic indulgences in alcohol. This stereotype was slowly dispelled as new medical findings emerged and as highly respected people publicly admitted their alcohol dependence and shared their successful (although often more apparent than real) recovery stories. Particularly critical in changing the way Americans view alcohol-use disorders were New York broker William Griffith Wilson (more familiarly known as Bill W.) and Ohio physician Robert Holbrook Smith (Dr. Bob). In 1935, these two recovered alcoholics developed a program to promote their successful philosophy for recovering from alcohol dependence. The program, which became known as Alcoholics Anonymous, has spread around the world, helping millions of members to avoid alcohol use and rebuild their lives (Haynes, 1988).

The American Medial Association is widely believed to have first accepted alcoholism as a disease in 1956, although the original resolution was not officially ratified until ten years later. In February of 1987, Dr. Smith introduced a motion that the AMA include all mood-altering drugs in the disease of chemical dependence, and the American Medical Society on Alcoholism and Other Drug Dependencies introduced the same motion in June of 1987. The AMA then passed a resolution that all drug addictions are one disease (Haynes, 1988).

During the early 1980s, the National Institute on Alcohol Abuse and Alcoholism and the National Institute on Drug Abuse shifted their funding emphasis to support research in the biology of addiction. In 1986, Harvard, Dartmouth, and Johns Hopkins broke with academic tradition and announced they were going to inaugurate courses in alcoholism in their medical schools (Milam, 1992). Other medical associations involved in expanding knowledge about alcoholism and drug dependency include: the International Doctors in Alcoholics Anonymous, the American Medical Society on Alcoholism, the California Society for the Treatment of Alcoholism and Other Drug Dependencies, the American Academy of Addictionology, the Association for Medical Education and Research, Substance Abuse (AMERSA), the National Institute on Alcoholism and Alcohol Abuse (NIAA) and the National Institute of Drug Abuse (NIDA). Today, the American Society of Addiction Medicine (ASAM) is the national organization that was given the task of unifying the physicians from around the country whose focus includes all forms of chemical dependence. Since its coagulation, ASAM has taken on the task of developing and administering a certification examination for physicians in the treatment of addictive diseases. With 1275 certified physicians, the latter half of this century has seen the

emergence of the new medical specialty of addiction medicine, although residency-training programs in addiction medicine have yet to be fully instantiated (Haynes, 1988).

*GENETIC RESEARCH*

The biological or "disease theory" model as it is articulated today recognizes that alcoholism is a primary addictive response to alcohol in a biologically susceptible drinker, regardless of character personality. Both animal and human studies have shown repeatedly that alcohol addiction is hereditary and indicate a number of in-born, pre-drinking biological differences in alcoholics – such as initial and progressive differences in their biological responses to alcohol, including alcohol metabolism, and in the effect of alcohol on performance, mood, and mental abilities (Milam, 1992). Despite the opposing belief that alcoholism is not a disease, but rather a conditioned response to psychosocial stress, the majority of the medical community today accepts the disease theory and focuses their research efforts on this model and its implications (Hewitt & Gordis, 2001).

Most of the support for the popularity of the disease model of alcoholism is based on genetic research that gives scientists positive indicators that alcoholism is inherited. Studies in the 1970's have shown that alcoholism runs in families—alcoholics are six times more likely than non-alcoholics to have blood relatives who are alcohol dependent (Goodwin et al., 1974; Cotton, 1979). Researchers have long sought to determine whether these familial patterns result from genetics, from a common home environment (which often includes alcoholic parents), or both. In their research, scientists investigate the possible genetic components of alcoholism by studying populations and families as well as genetic, biochemical and neurobehavioral characteristics (Cloninger & Begleiter, 1990).

Proponents of the biological model or "disease" approach to understanding alcoholism, support genetic research because the discovery of a specific genetic effect on the development of alcoholism would be beneficial for three general reasons:

1.) It could lead to the identification of some people at risk who could act to avoid developing alcohol related problems (Goodwin, 1989. Goodwin, in WM Cox (Ed.), 1990).
2.) Genetic research may help us to understand the role of environmental factors that are critical in the development of alcoholism (Cloninger et al., 1981).

3.) Genetic research may lead to better treatments, based on new understandings of the physiological mechanisms of alcoholism (Crabbe & Harris, 1991).

Three general research methods that scientists employ to learn more about the genetics of alcoholism include genetic marker studies, animal studies and twin/adoption studies. Each will be briefly described herein.

*Genetic Marker Studies*

Different models for the way in which alcoholism runs in families have been suggested by a limited number of family studies. Interpretation of these studies has been complicated by the likelihood that alcoholism is a heterogeneous condition (i.e., a collection of different conditions that look similar, but whose mechanisms and modes of inheritance may differ). Additional studies are needed to sort out the mechanisms of transmission (Hill, 1992; Gilligan, Reich & Cloninger, 1987).

To search the human genome for specific genes related to alcoholism, researchers may employ different methods of experimentation. These methods include DNA scanning, the candidate gene approach, and genetic marker studies. In DNA scanning, scientists scan the human genome which involves characterizing the entire length of DNA and finding genes that relate to alcoholism without proposing candidate genes (genes that are hypothesized to be connected with the expression of alcoholism). Genetic marker studies and the candidate gene approach test particular genes that are hypothesized to be related to the physiology of alcoholism. If certain genes are related to alcoholism, then genes lying close to them on the same chromosome – and the traits they determine – may be inherited at the same time that the risk of alcoholism is inherited. This phenomenon is called linkage. Assortments of genes hypothesized to be linked to alcoholism have been examined, but none have passed a rigorous test for linkage (Cook & Gurling in Cloninger & Begleiter, 1990; Goldman in Galanter, 1988).

*Animal Studies*

Another research method used in studying the genetics of alcoholism includes using animal models. These models have several advantages over human subjects insofar as researchers can study larger numbers and more generations of subjects, can arrange informative matings, can better manipulate the environment, and can make measurements that would not be possible on humans. Using the powerful genetic methods available through animal studies,

investigators are beginning to map genes that may be responsible for some of the animals' alcohol-related behaviors (Nadeau, 1990).

The main limitation of using animal research methods to study alcoholism is that there is no animal model of alcoholism that encompasses the whole spectrum of alcoholic behaviors in humans. Researchers have, nevertheless, studied alcohol-related behaviors in animals that are believed to resemble aspects of human alcoholism, and have succeeded in breeding lines of rodents with high or low measures of most of these traits. This success demonstrates that such traits are substantially genetically determined in rodents and could be genetically determined in humans as well (Phillips & Crabbe, in Crabbe & Harris, 1991).

*Twin Studies and Adoption Studies*

Two major methods of investigating the inheritance of alcoholism involving humans are studies of twins and adoptees. Further support for the idea of genetic transmission of alcoholism has been confirmed by such studies. Research findings indicate greater concordance rates in alcoholism for identical versus fraternal twins, and on the greater influence of the biologic versus the adoptive family in the development of alcoholism among adoptees. Pickens and co-workers (1991) studied 169 same-sex pairs of twins, both males and females, at least one of which sought treatment for alcoholism. They found a greater concordance of alcohol dependence in identical twins than in fraternal twins. In studying 902 male Finnish twins, Partanen and co-workers (1966) found that less severe drinking patterns were less heritable and more severe drinking patterns were more heritable.

Goodwin et al. (1973) found that male adoptees with alcoholic parents were four times more likely to become alcoholics than those without, although there was no alcohol abuse in the sets of adoptive parents. Cloninger and his fellow researchers subsequently performed a series of much larger studies of adoptees, which also revealed these trends (Cloninger, Bohman & Sigvardsson, 1981). Studies conducted by Schuckit et al. (1972) discovered that half-siblings with at least one alcoholic-biologic parent were far more likely to develop alcoholism than those without such a parent, no matter by whom they were raised.

There is still some debate within the medical community as to what sort of a role genetic influences have on a person's susceptibility to inheriting and expressing traits of alcoholism. Genes might play a direct role in the development of alcoholism, as in affecting the body's metabolism of alcohol; or they might play a less direct role, such as influencing a person's

temperament or personality in such a way that the person becomes vulnerable to alcoholism. The extent of the influence of genetic factors on the development of alcoholism is still pending further research, but enough studies seem to have confirmed that there is a genetic link (Hewitt & Gordis, 2001).

## *PREVENTION, TREATMENT APPROACHES AND RECOVERY*

Physicians can play an important role in treatment by educating patients to prevent the addictive cycle from starting, by being alert to risk factors, recognizing signs of alcoholism (particularly during its early stages), and initiating interventions designed to halt progression of this disease. The physician's prominent role in preventative treatment for alcohol dependency can be roughly divided into three categories: primary, secondary and tertiary prevention. Each phase of treatment entails an assessment of different factors, which will be briefly discussed herein.

### *Primary Prevention*

The goal of primary prevention is to identify those patients at risk for alcohol abuse and to educate them in order to stop the disease before it starts. The intensity of the steps taken during primary prevention will depend on whether the patient is considered a high-risk candidate for alcoholism or a low-risk candidate. Low-risk candidates who drink at all should be told to drink only in moderation (meaning no more than two standard-sized drinks per day) and never at work, before driving or when operating machinery. High-risk candidates (e.g., those with a strong family history of alcohol problems) are recommended to consider total abstinence as the best way to prevent alcoholism. They should also be encouraged to learn more about alcoholism by attending AA meetings as an observer and by reading AA literature or similar publications. Similarly, total abstinence is recommended for adolescents, persons with alcohol-sensitive conditions, recovering alcoholics, and patients with past alcohol-related problems (Blondell, Frierson & Lippman, 1996).

### *Secondary Prevention*

Secondary prevention aims to identify patients with early signs of the disease and halt its further progression. In its early stages, alcoholism has few specific signs or symptoms, but clinicians can prevent its further progression if they recognize them and intervene. Combinations of certain conditions may be suggestive of alcoholism. They include the

following four general categories: (1) Recognition by the patient of excessive consumption of alcohol or the need to "control" their drinking. (2) Negative effects on others when or because of drinking (or lack of drinking). (3) Adverse personal consequences when or because of drinking (or lack of drinking). (4) Evidence of tolerance, actual chemical dependence or the need to manage a withdrawal syndrome. More specific symptoms may include anxiety, depressed mood, drunk driving arrests, blackouts, dysphoria, dyspepsia, gastritis, elevated liver enzyme levels, hypertension, vague abdominal complaints, sleep disturbance, frequent job changes, marital/family problems, and myriad of other possible physical and psychological manifestations of this disease. During secondary prevention, the patient must be confronted, as decisive action is necessary to overcome any onset of denial, the main defense mechanism against recognition of the problem and acceptance of treatment (Blondell, Frierson & Lippman, 1996).

A treatment strategy is also recommended at this phase of prevention (i.e., attendance at Alcoholics Anonymous meetings, attempts at controlled drinking, etc.). If these measures show no improvement, further steps such as formal intervention, counseling, or commitment to an inpatient treatment center may be necessary (Blondell, Frierson & Lippman, 1996).

*Tertiary Prevention*

The goal of tertiary prevention is to treat and rehabilitate patients with chronic alcoholism to prevent a potentially fatal disease progression. Typically, 10 to 20 years of active drinking are needed to reach this stage, although in some individuals alcoholism proceeds more rapidly. Patients often require hospitalization for an acute medical problem, related or unrelated to alcohol. Tertiary prevention includes the following measures: (1) The assessment of risk for a withdrawal syndrome by obtaining information about the quantity and frequency of alcohol consumption. (2) Treating withdrawal syndrome and detoxification, as well as other possible complications (e.g., malnutrition), pharmacologically as needed. (3) Planning for rehabilitation after the patient stabilizes (Blondell, Frierson & Lippman, 1996).

*Treatment Approaches*

A positive, public health approach that integrates medical, psychological, and social therapies can lead to improved outcomes for patients who are addicted to alcohol and/or other substances. There have been several recent changes in the areas of treatment and recovery for alcoholism. Private treatment for alcoholism and drug abuse greatly expanded beginning in the late 1970's. Federal financing for the treatment shifted to service contracts and third-party

payments, and as a result, the primary locus for treatment changed from public institutions to private facilities and contractors (Peele, 1984). Between 1978 and 1984, the number of beds in private alcoholism treatment centers more than quadrupled. In the 80's hospitalization of adolescents in private psychiatric facilities mainly for drug and alcohol abuse, jumped 450% (Peele, 1991). Some research indicates that treatment does indeed have a dramatic impact in positively changing an individual's behavior. A recently completed 5-year study by the Center for Substance Abuse Treatment (CSAT) which involved thousands of clients in hundreds of alcohol and drug treatment centers, indicated that treatment dramatically reduces criminal behavior, reduces arrests by nearly 60%, and cut illicit, violent and risky sexual behaviors in half (Lucas, 1999).

There are, however, skeptics as to whether or not treatment centers are efficacious in and of their own right. One prominent skeptic is Enoch Gordis, M.D., the director of the National Institute on Alcohol Abuse and Alcoholism (NIAA). After studying a large hospital program that he himself administered, Gordis concluded, "contemporary alcoholism treatment is, at best, of limited effectiveness" (Peele, 1991). George Vaillant, a supporter of the disease theory of alcoholism, recently completed a research study of methods of treating alcoholism that included hospital detoxification, compulsory AA attendance, and a counseling program. Contrary to what one might expect, his findings indicated that his patients, who participated in the treatment programs fared no better after 8 years than alcoholics who did not participate in such recovery programs. He reflected that perhaps the best that can be said concerning the current methods of treatment is, at least, that they do not interfere with the natural recovery process (Vaillant, 1983).

Another important factor to acknowledge when considering whether or not people succeed in overcoming an addiction may not only be determined by the type of treatment they receive. Based on his research findings, Vaillant remarked, "the most important single prognostic variable associated with remission among alcoholics who attend alcohol clinics is having something to lose if they continue to abuse alcohol." Among Vaillant's own patients at an urban municipal hospital, many had little to lose, as 95% relapsed at some point after treatment (Peele, 1991). A study of an inner-city hospital alcoholism ward by John Helzer and his colleagues found that 93% of the patients were either dead or still abusing alcohol 5-7 years after treatment. It has been suggested that private treatment centers ordinarily show better

outcomes, partly because their clients are more likely to have families, jobs, and incomes (Peele, 1991).

*Treatment Methods*

Treatment methods of alcohol dependency vary depending upon an individual's medical and personal needs. Some heavy drinkers who recognize their problem appear to recover on their own. Others recover through participation in the programs of Alcoholics Anonymous or other self-help groups. Some alcoholics require long-term individual or group therapy, which may include hospitalization (Hewitt & Gordis, 2001).

Numerous studies indicate that simple, brief interventions can be effective in changing drinking behavior in those who are not severely alcohol dependent. In brief interventions, a problem drinker meets with a health professional for one to four sessions, with each session lasting from a few minutes to an hour. During these meetings, the health professional makes the person aware that his or her current drinking patterns or medical problems are related to alcohol abuse and could progress to alcohol dependence (Hewitt & Gordis, 2001).

For some alcoholics, treatment begins with detoxification, which normally requires less than a week, during which time patients usually stay in a specialized residential treatment facility or a separate unit within a general or psychiatric hospital. These facilities also offer extended treatment programs to help alcoholics in their recovery (Hewitt & Gordis, 2001).

Treatment may also involve individual counseling and group therapy to help a person who is alcohol dependent adapt to a new way of life that is not driven by alcohol. Throughout the United States, public outpatient and inpatient clinics offer a variety of treatments for alcoholics. Many public mental hospitals and Veterans Administration hospitals, as well as private clinics and hospitals, treat alcohol dependence (Hewitt & Gordis, 2001).

Physicians may prescribe medications to help prevent alcoholics from returning to drinking once they have stopped. The drug disulfiram (sold under the trade name *Antabuse*), interferes with the way the body processes alcohol, producing extremely unpleasant reactions when alcohol is ingested, but shows no noticeable effect unless a person drinks alcohol (Fuller et al., 1986). Naltrexone (*ReVia*) is a narcotic approved for use in alcohol treatment in 1995. Although scientists are not certain how this medication works in the brain, it reduces an alcoholic's craving for alcohol, most likely by blocking the positive effects the individual gets from drinking alcohol. Indications are that Naltrexone is most effective when it is used in

combination with counseling programs such as individual and social therapies (Voipicelli et al., 1992; O'Malley, 1995).

*Recovery*

Since there is no cure for alcoholism, even sober alcoholics are said to be "in recovery," a lifelong process. Total abstinence from alcohol and other sedatives (including prescription drugs) is said to be the cornerstone of managing recovery. Relapses are a common part of the recovery process as well and should be expected and planned for. Discussion of temptations, means of coping, support systems and a non-drinking, healthful lifestyle (i.e., diet and exercise) is often helpful. Follow-up aftercare programs may assist in helping a recovering alcoholic maintain sobriety. Such programs may include group therapy, individual psychotherapy, employer-mandated monitoring programs, and self-help groups such as Alcoholics Anonymous (Blondell, Frierson & Lippmann, 1996).

*Alcoholics Anonymous*

Until the mid-1930s, alcohol-dependent individuals who could not afford a private sanitarium or psychiatrist could find help only at state hospitals, in jails, or through street ministries. The formation of Alcoholics Anonymous (A.A.) in 1935 marked the first non-medical approach that made sustained recovery from alcohol dependence possible for many individuals. Today nearly 2 million people worldwide claim membership in A.A. Its rapid growth and wide acceptance were due to the melding of its strong ethnoreligious support with its backing as medical dogma. In no other Western country have A.A. and the recovering alcoholic attained such a central role in the formulation of alcoholism policy and alcoholism treatment as in the United States (Peele, 1984).

The A.A. program promotes psychological principles that help people live a healthy, stress-free lifestyle where the individual learns that he or she suffers from a disease and gains support and encouragement to stay sober through group interaction and help from his or her own conception of a "higher power." The organization functions through local groups that have no constitutions, officers, or dues. Anyone who has a drinking problem may become a member, provided he or she is willing to abstain from alcohol and make an honest attempt to live by the principles outlined by the organization (Alcoholics Anonymous, 1935).

*Other Recovery Approaches*

While Alcoholics Anonymous is widely recognized as an effective source of support, not everyone responds to the group's spiritual bent. Other recovery approaches include Rational Recovery, an organization that promotes lifelong abstinence from alcohol and teaches people how to recognize psychological “triggers” to combat the urge to drink. Another non-A.A. organization is the Secular Organizations for Sobriety/Save Our Selves (SOS), which endorses a program that separates recovery from spirituality whereby individuals are encouraged to rely on themselves and others in the group – not a spiritual power – to gain sobriety (Hewitt & Gordis, 2001).

*Concluding Remarks*

The disease of alcoholism is vast and all encompassing, and affects many, if not all areas of the alcoholic’s life. The effect of this disease on social institutions and its impact upon the medical field has been magnanimous. Research efforts regarding the biological components of this disease have just begun, and are far from being exhausted. While there is much left to be resolved regarding our understanding of the nature of this disease and its various implications on both the individual and societal level as well, this paper is expected to have been successful in at least establishing the following summary points with respect to our current understanding of alcoholism:

1.) That alcoholism is a progressive, often fatal disease having genetic origin, influenced by social, psychological and environmental factors, and should be distinguished from heavy drinking.
2.) The disease of alcoholism has a drastic negative impact on both the individual and on society.
3.) Genetic research is discovering more and more evidence in support of the disease theory of alcoholism, although many advancements have yet to be made.
4.) Physicians can take active steps in preventative treatment of alcoholism.
5.) Treatment approaches may or may not be effective, but do not seem to be interfering with the recovery process.
6.) There are a variety of treatment approaches and recovery options available to the individual seeking help.

Clearly, we are still lacking scientific answers to many key questions about alcoholism; including: why alcoholism is transmitted, how it affects complex neurobehavioral systems, whether or not such genetic transmission can be prevented, and whether or not we can design medication to stop the addictive cycle before it becomes destructive, if one is found to have such a genetic susceptibility. Only time and scientific efforts will provide such answers. In the meantime, the paradigmatic shift from understanding alcoholism as a psychological response to our current understanding of alcoholism as a biological response has greatly affected treatment programs, research methods and social attitudes regarding our perception of alcoholism and of alcoholic individuals. We can only hope that as scientific research methods are refined and as we learn more about the human genome, that we will be able to discover more about this genetic susceptibility that is expressed in multitude of aspects that differentiate the alcoholic from the non-alcoholic. Such findings would not only provide us with a better understanding of the disease of alcoholism and the alcoholic, but a better understanding of ourselves as well.

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