
ALCOHOL

How does alcohol damage your body?

What can you do about it?

Alcoholism ranks with cancer and heart disease as a major threat to the nation's health. It is the most treatable but untreated disease known to man. At least two-thirds of today's adult population—about 100 million Americans—use alcoholic beverages. Ten million are alcoholics. But you don't have to be an alcoholic to be affected by the use of alcohol.

Alcohol and Michigan

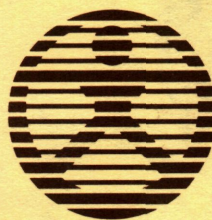
"More than 56% of Michigan's highway deaths are alcohol related. So are at least 53% of fire deaths, 22% of home accidents, and 45% of drownings. Violent behavior attributed to alcohol abuse accounts for 64% of all murders, 41% of all assaults, 35% of rapes, 30% of suicides, 60% of child abuse, and 56% of fights and assaults in the home."

Drinking alcoholic beverages has always been part of the American way of life. Seventeenth and 18th century America was notable for the amount of alcoholic beverages consumed. Li-

quor was food, medicine, and social lubricant. It flowed freely at weddings, christenings, and funerals, at the building of churches, the installation of pews, and the ordination of ministers.

During colonial days it was felt that people drank and got drunk because they wanted to, not because they **had** to. Colonial Americans did not think alcohol disabled the will nor was addictive. Not until the end of the 18th century and in the early years of the 19th did Americans begin to report their addiction to alcohol. The idea that drugs are inherently addicting was first systematically worked out for alcohol and then extended to other substances. Alcohol was regarded as addicting long before opium.

Most people who use alcohol don't become addicted to the drug. However, for about one drinker in ten, alcoholism has been the result. For some unknown reason, these people can't handle alcoholic drinks. This is a disease that has profound, even fatal, consequences on the alcoholic as well as on others.



FITNESS 7

Michigan State University

What Is Alcohol?

If you want to learn about the substance known as alcohol, the best place to look would be in a pharmacology book. Under the category of drugs classified as sedatives, you'll find ethyle alcohol, the chemical name. Unlike other drugs in this category, however, you'll find alcohol is not considered an important therapeutic agent to be prescribed in medicine today. On the contrary, the importance of alcohol lies in its use as a self-prescribed social drug.

It is the alcohol in a beverage which causes damage to the body. The oldest alcoholic drinks were fermented beverages of relatively low alcohol content; that is, the beers and wines. When the Arabs introduced the science of distilling to Europe in the Middle Ages, the alchemist believed that alcohol was the long sought "elixir of life." The word, *whiskey*, actually means "water of life."

Beers ordinarily contain no more than 2 to 4 percent alcohol, although some may contain up to 6 percent. Wines contain approximately 12 percent. Fortified wines (sherry and port) are prepared by adding brandy to wine. Their alcohol content may be in excess of 20 percent. Whiskey, brandy, rum, gin, and other distilled liquors contain 35 to 50 percent alcohol. The following drinks would contain about the same amount of alcohol: 1½ ounces of whiskey, brandy, rum, vodka, gin; 3½ ounces of fortified wine; 5½ ounces of ordinary wine; 24 ounces (2 bottles) of beer.

By strict definition, alcohol is also classified as a food because it provides kilocalories. However, it has no nutritional value. And unlike most foods, alcohol does not require digestion. It is absorbed directly into the blood vessels of the stomach and intestines.



Alcohol in the Body

The damaging effects of alcohol, to non-alcoholics as well as alcoholics, take place while it is in the blood. It is transported through the bloodstream to the different parts of the body which can be affected. Studies indicate that no more than 15 to 16 ounces of alcohol can be metabolized (gotten rid of) in 24 hours. For the most part, the time it takes to metabolize alcohol cannot be changed. Therefore, the more you drink, the longer the alcohol is in your blood to cause damage.

Also, the more you drink, the higher your blood-alcohol concentration. The relationship between this concentration and the drug's effect varies in different people. However, the general relationship is as follows:

Concentration alcohol/blood	Drug effect
50 mg/100 ml (The level produced by 2 ounces of whiskey in 2 hours.)	Euphoria and minor motor disturbances.
60 mg/100 ml	Nystagmus (rolling of the eyeballs. More errors on simple tests.
80 mg/100 ml (3 ounces of whiskey in 2 hours.)	Impaired driving ability.
100-150 mg/100 ml	Gross motor incoordination.
200-300 mg/100 ml	Will not remember the experience.
300-350 mg/100 ml	Coma.
355-600 mg/100 ml	May cause or contribute to death.

The amount of alcohol that gets into the blood at one time depends primarily on four things:

1. *How much of and how quickly the alcohol is drunk.* Since the body can only get rid of a certain amount of alcohol in a certain period of time, the amount you drink, the alcohol content of the drink, and how quickly you drink are extremely important. In the adult, the average rate at which alcohol can be metabolized is less than 1 ounce per hour. Thus, the alcohol in about 4 ounces of whiskey or 3½ 12-ounce bottles of beer would require 5 or 6 hours to be processed by a person of average size.

2. *How quickly the alcohol is absorbed.* If food is being or has just been eaten, the absorption of alcohol is slowed down because the alcohol can't get into the small intestines until the food goes through its digestive process. Also, food covers the surface lining of the stomach and slows the time it takes for the alcohol to be absorbed. Foods high in fat, such as meats, cheeses, nuts, and dips, are digested more slowly and are the most effective in slowing alcohol absorption. Also, drinks which mix alcohol with water or fruit juices are absorbed more slowly than those mixed with carbonated beverages, such as soda, tonic water, and colas. Drinking on an empty stomach allows the alcohol to begin the process of entering the bloodstream almost immediately,

3. *Body weight and total body water.* After absorption, alcohol is evenly distributed throughout the body in proportion to the water content of the various tissues. The body as a whole is 70 percent water; the blood is about 90 percent water. A large person has a larger overall quantity of water in the body; therefore, blood-alcohol concentration is lower. Body weight and size of the liver also have an important influence on the concentration of alcohol in the blood and, thus, on how different amounts of alcohol will affect a person.

4. *The rate of metabolism.* Although alcohol can be rapidly absorbed, the process of elimination is a slow one. Less than 10 percent of the alcohol is passed out of the body in the urine, exhaled by the lungs, or lost in perspiration. More than 90 percent of the alcohol is chemically converted by three steps of oxidation. The liver is chiefly responsible for the first step where the alcohol is converted to a substance known as acetaldehyde (which is extremely poisonous). The second step, oxidation of the acetaldehyde to acetic acid, takes place in the liver and in other tissues that contain a substance known as aldehyde dehydrogenase. The third step converts the acetic acid to harmless water and carbon dioxide.

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of withdrawal symptoms.***

Potential Body Damage

Central Nervous System

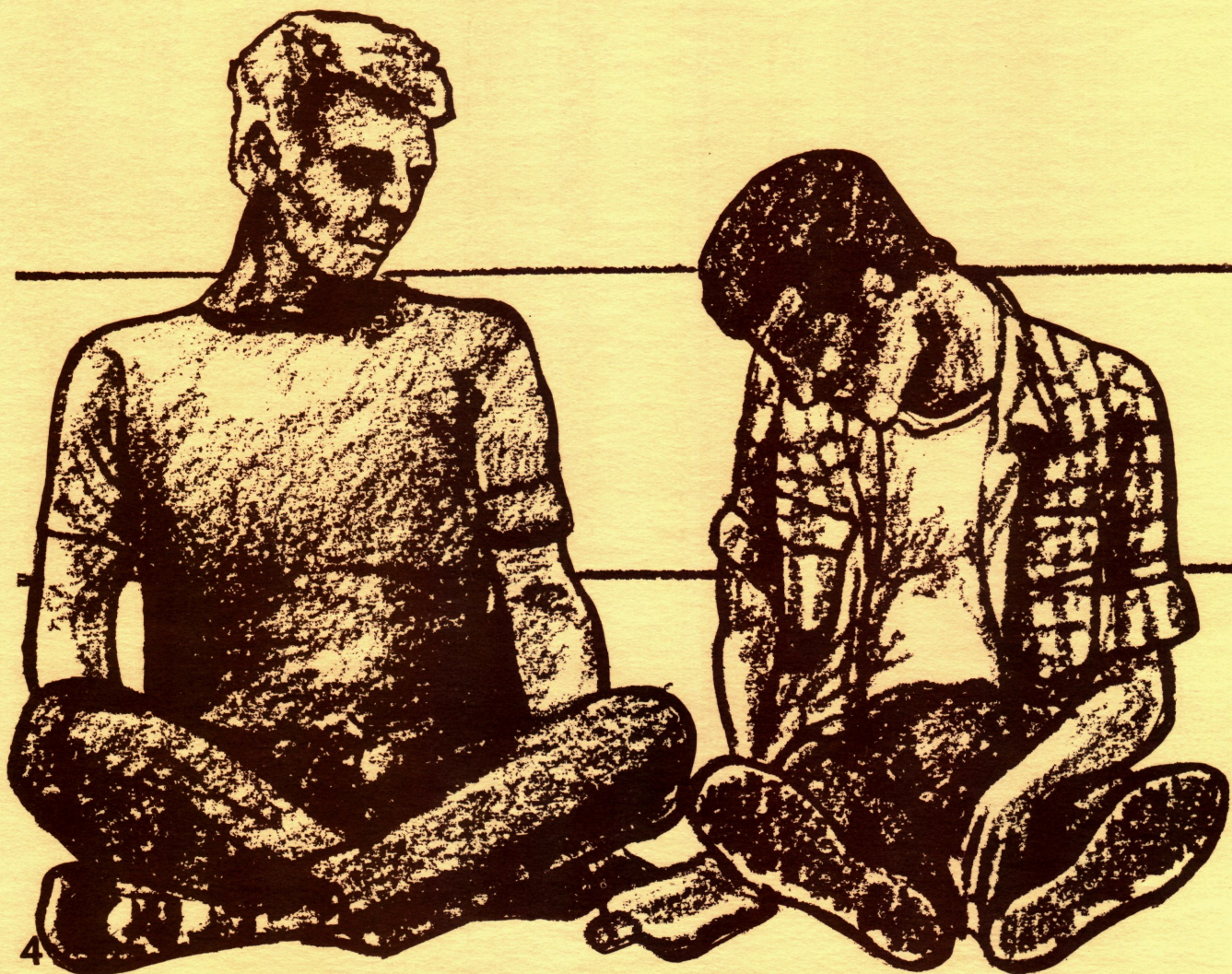
Alcohol is classified primarily as a sedative drug with potential action like that of general anesthetics. It has its most marked effect on the central nervous system. This two-way communication system made of the brain, spinal cord, and nerves controls the voluntary action of your body, such as the movement of legs and arms. Nerve branches throughout the body come together as a trunk line in the spinal cord. The largest part of the brain, the cerebrum, is the center of intelligence—thinking, reasoning, memory, and judgment. The cerebrum receives messages brought by the nerves and orders the proper action. The lower parts of the brain, the cerebellum and medulla, control the body's ability to maintain balance and coordinate movement and the involuntary actions such as breathing and heartbeat. The lower parts of the brain work along with the cerebrum.

The brain requires a large blood supply to function. Circulating blood carries alcohol to the brain where it has a marked effect. The brain's

ability to work is disturbed which ultimately impairs other organs and body systems. Alcohol acts like an anesthetic on the brain—the more alcohol, the stronger the effect. The brain is steadily put to sleep, going from the higher to the lower centers of activity. First affected is judgment, inhibition, and memory. Then follows loss of coordination with slurred speech, hearing and visual difficulties. Then stumbling, falling, and eventually coma.

The question of whether alcohol is a stimulant has long been debated. Some people think of alcoholic drinks as stimulating. However, most scientists agree that this apparent stimulation results from depression of those areas of the brain which control intelligent response.

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Cardiovascular System

The immediate effects of alcohol on the circulation are relatively minor. Alcohol in moderate doses causes vasodilation (expansion of blood vessels). This causes a flushed skin and a feeling of warmth. Loss of heat from the body is increased. With large amounts of alcohol, the central temperature-regulating mechanism becomes depressed and the fall of body temperature may become pronounced.

Recent studies make it clear that chronic excessive use of alcohol is harmful to the heart. Lesions have been observed on the heart muscle wall which ultimately affect its function. Other cardiovascular problems associated with heavy drinking are largely due to malnutrition and vitamin deficiency.

Anginal pain is sometimes relieved by drinking alcohol. This is probably because the blood vessels dilate throughout the body and that reduces the work of the heart.

Blood pressure changes occur, but those changes vary widely according to the amount of alcohol in the blood. With small or extremely large amounts, a decrease in blood pressure is usual. But moderate amounts may actually increase blood pressure.

Skeletal Muscle

The total amount of work accomplished by a person under the influence of small doses of alcohol may be increased. Although alcohol is a readily available source of energy for muscular work and, in addition, may improve circulation in the muscle, the increased performance is largely due to a lessened appreciation of fatigue. Large doses of alcohol, however, cause depression of the central nervous system and a decrease in the amount of muscular work achieved. Large doses also directly damage the muscle.

Gastrointestinal Tract

Strong alcoholic drinks, with 40 percent alcohol and over, are quite irritating to the lining of the stomach. In fact, one of the most common substances known to cause ulceration or erosion of the stomach lining is alcohol. Habitual use of large amounts of alcohol may lead to constipation, but that is probably because the drinker eats less food and does not have enough bulk residue. On the other hand, diarrhea may result from the irritant action of certain flavoring oils. Alcohol taken in moderate amounts does not significantly influence motor activity of the colon, but taken to the point of intoxication, it results in almost complete inactivity of the colon.



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Liver

Alcohol is chiefly metabolized in the liver. Chemical processes which bring about the breakdown of alcohol promote the accumulation of fat in the liver.

For years, it was assumed that liver damage must result from the chronic abuse of alcohol, but research indicates there are other factors involved. The severe and irreversible liver impairment so frequently seen in the alcoholic appears to be caused by malnutrition as well as alcohol. This malnutrition is a special kind, caused not only by lack of food, but also by the process the liver must go through when alcohol is present. The oxidation of alcohol uses up all the available NAD (nicotinamide adenine dinucleotide) in the liver cell. NAD, one of the most important forms of niacin in the body, is a vital link in several hundred reactions of the liver. Naturally, these reactions are impaired if NAD is not available.

Kidney

Alcohol tends to increase the flow of urine. This effect increases with an increased alcohol concentration in the blood. However, studies indicate that repeated doses of alcohol may have a reverse effect.

Nutritional Status

Usually, as a person drinks larger amounts of alcohol, the alcohol is not added to the normal diet but replaces part or most of it. The alcohol supplies kilocalories but not vitamins or protein. This can result in poor nutrition or disease.

Alcohol decreases appetite, usually irritates the stomach lining, and promotes euphoria, none of which leads to proper eating habits. Many alcoholics live lonely lives and soon run out of money. These things, too, set the stage for malnutrition.

Unborn Child

During pregnancy alcohol passes easily through the vascular system of the mother, to the placenta, and then to the unborn child. Alcohol in the bloodstream of the unborn child is in the same concentration as it is in the mother. If the mother is drunk, so is the baby. The problem for the fetus is complicated because its liver, the key organ for removing alcohol from the blood, is not fully developed. Because the undeveloped liver works slowly, most of the alcohol cannot be eliminated except by returning to the mother's system. This cannot happen until the mother's blood alcohol level goes down. Therefore, the fetus "holds" the alcohol until the concentration in the mother decreases.

***If the pregnant mother
is drunk,
so is the baby.***

A pregnant woman who drinks heavily risks having a child with birth defects. These defects may include severe growth deficiency, heart defects, malformed facial features, and mental retardation. As a whole, these defects which result from alcohol abuse are known as "fetal alcohol syndrome."

Fortunately a woman can prevent "fetal alcohol syndrome" by completely avoiding alcohol during pregnancy. At the very least no more than two drinks per day can help avoid potential harm to the unborn child.

Hangover

A hangover is a moderate level of withdrawal symptoms. The intensity of these symptoms will vary, depending on the amount of drug taken and the rate of withdrawal. A hangover is more common after taking alcohol than after using one of the other short-acting sedative-hypnotics because of the metabolic effects of alcohol and also because so many more doses of alcohol are usually taken.

Nondrug factors are also involved in the production of alcoholic hangover, such as remorse (or at least regret), loss of sleep, unaccustomed activity, and anxiety. But some withdrawal symptoms are still evident under conditions that control these nondrug factors.

The quickest and most effective treatment for alcoholic hangover is more alcohol. But the danger of this in setting a drinking pattern is obvious.



Alcohol Misuse

Recent studies indicate that alcoholism is increasing among women at an alarming rate. Only a few years ago, male alcoholics outnumbered their female counterparts 5 to 1. Today, most authorities in the field say the ratio is 1 to 1.

Alcoholism is an extremely complex problem. While the exact cause still escapes scientists, a number of physiological, psychological, and genetic factors have been associated with its development. There are still major gaps in our knowledge about these factors and their exact role or to what extent they influence the development of the disease.

It is difficult to get reliable data on children about such sensitive areas as drinking behavior, but it is evident that alcohol use is on the

increase among American school children, beginning as early as the fourth grade.

Facts about school-age children from the National Institute of Alcohol Abuse and Alcoholism surveys show.

1. More than one-fourth of the 12- to 13-year-old boys and two-thirds of all 18- to 20-year-old male high school students are moderate to heavy drinkers. (A heavy drinker drinks at least once weekly, consuming five or more drinks at a typical sitting.)

2. Moderate to heavy drinkers are more likely to use marijuana and hard drugs than are nondrinkers.

3. More than 40 percent of all students with D and F grades are moderate to heavy drinkers, compared with only 11 percent of A students.

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Signs of Developing Alcoholism

According to Dr. Selden Bacon, Director of the Center of Alcohol Studies, Rutgers State University, "People who drink in a significantly different manner from others in their group are likely to be called alcoholics." Dr. Bacon makes the further observation that regardless of the approved custom for drinking within various groups, most authorities in the field regard the following list as the common behavioral deviations which indicate an American drinker is an alcoholic.

1. This person begins to drink more than the other members of the group.
2. This person begins to drink more frequently than others.
3. With increasing frequency, this person goes beyond the allowed license for drinking behavior.
4. This person begins to experience "black-outs" or temporary amnesia during and following drinking episodes.
5. This person drinks more rapidly than others—drinks are gulped.



6. This person sneaks drinks.

7. This person begins to lose control as to time, place, and amount of drinking. He or she drinks—and often gets drunk—at inappropriate times and places without intending to.

8. This person hides and protects the liquor supply so he or she will never be caught short.

9. This person drinks to overcome the hang-over effects of prior drinking.

10. This person tries new patterns of drinking as to time, place, amount, and types of drink.

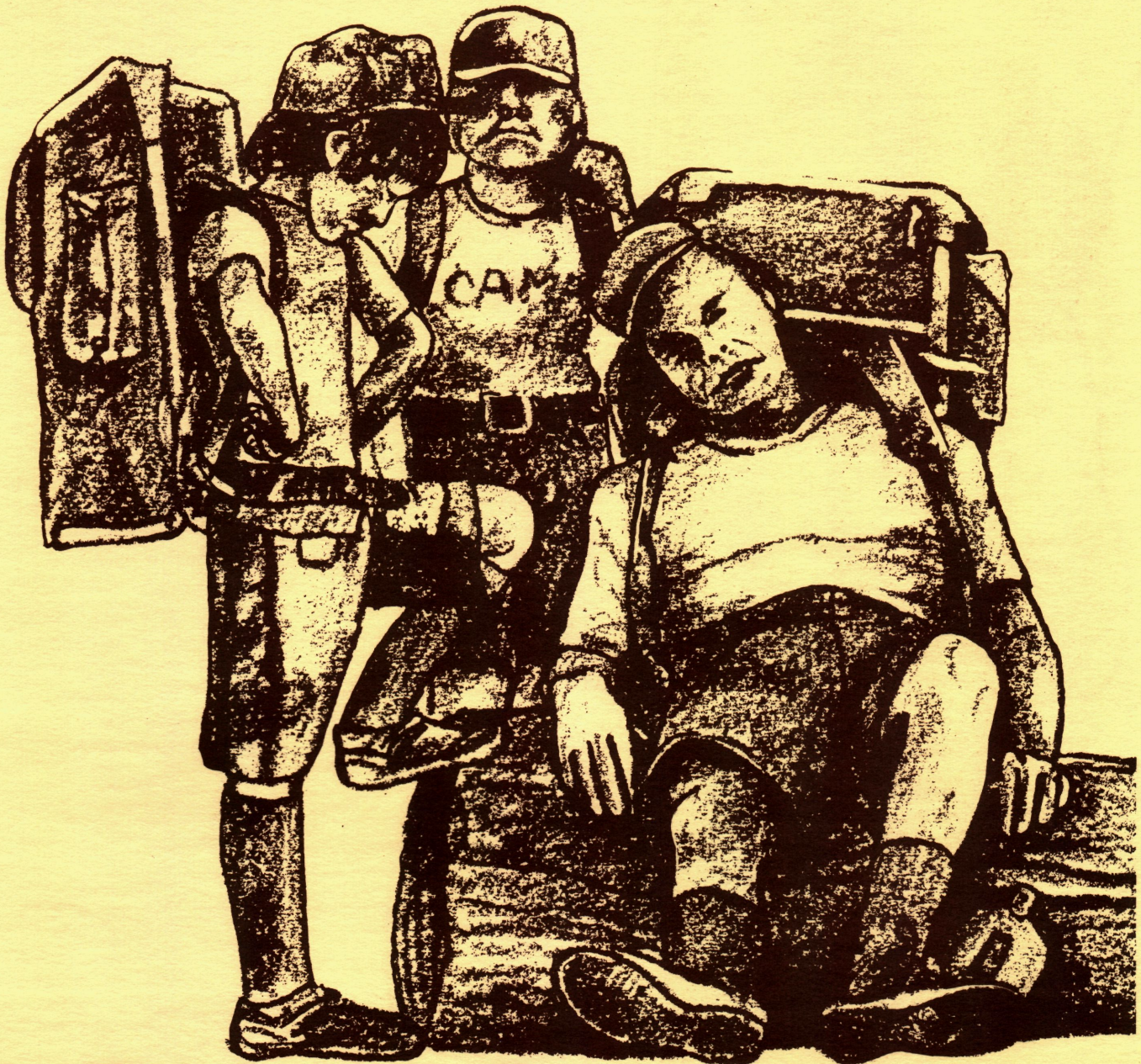
11. This person attempts "geographical" cures by moving to new locations or "traveling" cures by seeking out different drinking groups, usually of a lower social status.

12. This person becomes a "loner" while drinking.

13. This person develops an elaborate system of lies, alibis, excuses, and rationalizations to cover up or to explain his or her drinking.

14. This person has personality and behavioral changes—even when not drinking—which adversely affect the family situation, friendship groups, or on-the-job relationships. Accidents, job losses, family quarrels, broken friendships, and trouble with the law may take place, even when he or she is not under the influence of alcohol.

15. Characteristics of the final phases are obvious and tragic: extended binges, physical tremors, hallucinations and deliria, complete rejection of social reality, malnutrition with accompanying illnesses and diseases—and an early death.



Most alcoholics do not go into treatment voluntarily.

What Can We Do?

Experts in the field of alcohol studies have said that one of the biggest myths associated with alcoholism is that the alcoholic can't be helped until he or she "hits rock bottom." However, the fact is, most alcoholics do not go into a treatment program voluntarily. They are coerced. There seems to be three major levers used to coere an alcoholic into treatment:

1. Law. Persons brought before the courts for offenses which indicate alcohol abuse can be given a choice of serving a jail sentence or entering a treatment program.

2. Employer. Persons whose misuse of alcohol creates problems on the job can be given an option of getting help or losing the job.

3. Family. If there is alcohol abuse by a family member, other members of the family can seek help first and be taught how to deal constructively with the problem. This may include delivering an ultimatum to the person with the drinking problem.

The key to prevention or rehabilitation is knowing and using the resources available which deal with all aspects of the problem. Many community and social agencies can tell you where to find help. Programs which design the treatment for each patient's needs and resources have the best results. Up to two-thirds of the people who seek help recover from alcoholism.

The federal government and many local agencies now have programs that explain the responsible and irresponsible use of alcohol, its effects, and its potential for harm. The aim of these programs is to prevent alcohol problems by making the public aware of the facts about alcohol.

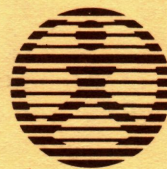


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NUTRITION
AND WEIGHT
STRESS
EXERCISE
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FITNESS 7

MICHIGAN STATE UNIVERSITY



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