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HEAT STRESS AND OLDER AMERICANS: PROBLEMS AND SOLUTIONS

AN INFORMATION PAPER

PREPARED BY THE STAFF OF THE

SPECIAL COMMITTEE ON AGING
UNITED STATES SENATE

JULY 1983

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PREFACE

In July 1980, almost half of the United States was hit by a heat wave. Thousands of older Americans lost their lives. The magnitude of that natural disaster shocked the Nation, and prompted the U.S. Senate Special Committee on Aging to hold a joint hearing with the Subcommittee on Aging of the Senate Committee on Labor and Human Resources on July 25, 1980. Grim testimony presented at the hearing not only emphasized the heavy price we paid in human lives and suffering, but also demonstrated how unprepared our communities were for that heat wave. The Committee on Aging is concerned in particular for the safety and welfare of vulnerable older Americans.

The committee finds it particularly encouraging that a cooperative public/private sector task force, with leadership from the Administration on Aging, is working to develop educational resources on heat stress for older Americans and their families. These important efforts are to be commended. More government agencies and private sector companies need to participate in this worthwhile partnership, and the scope of its activities should be expanded in the coming year.

While the Federal Government does have an important leadership role to play in anticipating and planning for future heat waves, the committee also recognizes that the success or failure of preventive measures ultimately will depend on action taken at the community level.

This publication provides information on the scope of the heat stress problem, and discusses preventive health concepts and ideas for community planning. The committee feels this information will be of great value to community leaders, health care, social service, energy, and aging professionals in preparing for future hot weather disasters.

The Center for Environmental Physiology, a nonprofit organization in Washington, D.C., which conducts research on heat and cold stress, is presently coordinating the development of a national demonstration program to focus on the health of older Americans during hot and cold weather. The cooperation and expertise of the center, and its executive director, W. Moulton Avery, has proven invaluable in the development of this publication on heat stress.

The committee also is grateful for the cooperation and assistance given in the preparation of this publication by the Center for Environmental Assessment Service of the National Oceanic and Atmospheric Administration, and by the Administration on Aging, the American Gas Association, the U.S. Office of Consumer Affairs, and ACTION's older American volunteer programs. Additional information on heat stress is available from the national organizations listed in the appendix on page 13.

JOHN HEINZ,
Chairman.
JOHN GLENN,
Ranking Minority Member.

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HEAT STRESS AND OLDER AMERICANS: PROBLEMS AND SOLUTIONS

A. HOT WEATHER SPELLS DANGER FOR OLDER AMERICANS

Prolonged periods of very hot weather—heat waves—claim more lives nationally than any other natural disaster, including floods, tornadoes, and hurricanes. Between 1963 and 1966, two national heat waves claimed over 11,000 lives. Over 20 States suffered from a 3-month heat wave in 1980. Mortality data for the 1980 heat wave must still be fully analyzed, but preliminary evidence suggests more than 10,000 heat-related fatalities.

Heat waves need not be national in scope to cause significant mortality. Geographically limited heat waves—affecting only a portion of a State—are equally deadly. In Los Angeles, for example, excess deaths during each of three brief heat waves were greater than in any recorded natural disaster in California's history, including the great earthquake and fire of 1906.

The South holds no monopoly on heat wave deaths; there are large numbers of excess deaths in the Northern States as well. For example, in 1966, over 1,100 people died during a 2-week heat wave in New York City.

Older people are primary victims of heat waves. A recent Center for Disease Control study of the 1980 heat wave found heatstroke rates in persons 65 or older to be 12 or 13 times higher than the rate for the remainder of the population.

Several factors contribute to this increased vulnerability to heat stress, including: Less cardiovascular stamina; heart damage; less responsive blood vessels; underlying diseases; and a decreased ability to sweat. Older citizens use more prescription medications, many of which increase the risk of heat-related medical problems.

1. How Heat Affects the Body

Average normal body temperature, as recorded with an oral thermometer, is 98.6° F. To remain active, alert, and healthy, an individual must maintain a temperature within a very narrow range of this norm—a large rise or fall in body temperature can be fatal.

The body responds to hot weather by increasing blood flow to the skin and by sweating. Evaporating sweat carries away large amounts of heat from the skin surface, thus working to maintain a normal body temperature in hot weather. Very hot weather increases the effort needed to keep a normal temperature. In addition, high humidity can compound stress because it interferes with the process of evaporation.

Heat stress is the term used to describe the burden which very hot weather places on the heart and blood vessels—the backbone of the

body's cooling system. Heat stress causes heat exhaustion, heatstroke, heart failure, and stroke. Any disease or weakness of the heart and blood vessels makes a person much more vulnerable to heat stress because of the severe handicap placed on the body's cooling system.

When the body's cooling system is overwhelmed by the heat, the result is heatstroke. Heatstroke is a medical emergency. Rapid build-up of heat causes the body temperature to rise above 106° F. Unless the temperature is reduced quickly, massive internal damage results in death. Studies of heat waves show that both heart failure and strokes (cerebrovascular accidents) account for a far greater number of fatalities during heat waves than heatstroke. With diminished cardiovascular stamina, older people are particularly vulnerable to these conditions.

2. Conditions Which Increase the Danger

A number of physical and environmental conditions increase the risk of developing heat-related medical problems during periods of very hot weather. Older Americans with heart and circulatory problems, kidney problems, respiratory illnesses, skin diseases, obesity, and fever are at even greater risk during heat waves than other members of the older population. The chances of developing a potentially fatal medical problem during a heat wave are increased by the physical conditions listed below:

Weak or damaged heart
Hypertension
Emphysema
Problems with circulation
Diabetes
Previous stroke
Infection or fever
Overweight
Diarrhea
Skin diseases or sunburn (which can reduce sweating)
Any debilitating illness

(a) prescription drugs

The Center for Environmental Physiology recently published a study emphasizing the relationship between drugs and accidental hypothermia, and maintains that greater research and education are needed to define this point with respect to heat. The use of numerous medications, such as those having anticholinergic properties (phenothiazines, tricyclic antidepressants, and antihistamines), as well as narcotics, sedative hypnotics, and amphetamines can seriously predispose an individual to heat-related medical problems. Consumption of alcoholic beverages can have a similar effect.

Medication which depresses or interferes with the body's natural temperature control system represents a risk in hot weather. Many older people take medications with these properties, a fact which underscores the need for patient education and increased monitoring of drug use during periods of hot weather.

(b) urban environments

Concrete, asphalt, and masonry retain heat; dense concentration of buildings restrict airflow. These conditions combine to create a "heat-island" effect in urban environments—and a much higher level of heat stress than that found in suburban or rural areas.

(C) THE FRAIL ELDERLY

Because of their reduced physical stamina, frail or incapacitated residents of nursing or boarding homes are particularly vulnerable during hot weather. During a 4-day heat wave, California reported a fivefold increase in deaths in nursing homes and in persons 65 years or older. Even hot weather which does not reach the heat wave stage threatens nursing home residents. A Center for Disease Control study reported a dramatic increase in illness and death among residents of a Florida nursing home. Investigation showed the complete breakdown of the home's air-conditioning system was at fault. Even though outdoor temperatures were mild by heat wave standards, the air-conditioning system failure created lethal conditions inside the home for many elderly residents.

3. The Economics of Preventing Heat Wave Deaths

According to data supplied by NOAA's Center for Environmental Assessment Service, electricity consumption for cooling increased by $1.4 billion during the summer of 1980. Obviously, the cost of keeping cool adversely affects low-income individuals who have reduced access to good housing, air-conditioning, medical care, and other supportive services.

Testimony before the Aging Committee by Peggy Edmiston, director of health and public safety for Shelby County, Tenn., illustrated this point. Edmiston's comments focused on the tragic plight of the elderly poor:

> **The heat crisis brought to our attention hundreds of poor elderly not previously known by health and social agencies. These persons, living in unair-conditioned, unventilated facilities were confused, oftentimes did not know who they were, hungry, without proper clothing, and many incontinent. The majority had medical problems, but did not have a doctor, and many had not been seen in a clinic or by a physician for over 1 year.**

During the 1980 heat wave, even elderly with access to air-conditioning used it sparingly, if at all, fearful of high utility bills. In the case of the elderly poor—with few having access to air-conditioning, and many without even cooling fans—the dilemma was magnified.

Witnesses at the committee's joint hearing on the 1980 heat wave reported case after case of victims found in homes with fans or air-conditioners unplugged. Long-term care facilities were not immune to the increase in electrical costs. One nursing home in Missouri was given 18 fans during the 1980 heat wave, but used them for only a portion of each day, stating that the cost of continuous operation was more than they could afford.

A major issue in national public policy debates on energy assistance is the necessity for air-conditioning. Many public officials argue it is a luxury which should be exempted from public support. At a recent Aging Committee hearing on "Energy and the Aged," Senator Chiles (D-Fla.) strongly criticized this argument. Chiles told the committee, "It doesn't take just an extraordinary heat wave to severely harm and even kill many elderly people." He explained that normal heat and humidity can also cause extreme discomfort and illness to persons afflicted with asthmatic and respiratory conditions or heart problems. For these people, many of whom are elderly, cooling is certainly not a

luxury—it is a medical need. "Thousands of elderly are found to have fans or window units but don't use them for fear of utility costs," Chiles said. Senator Chiles continued:

> During last summer's heat wave, witnesses told this committee about instances where volunteers found elderly persons who were mortally afflicted by the heat—yet they had unplugged window units or fans in the same room. To think that people died from heat prostration because of the overwhelming fear of an electric bill is simply shocking.

During the 1980 heat wave, several St. Louis hospitals without air-conditioning requested emergency assistance from the U.S. Air Force and Army Reserve to secure portable units. In testimony before the committee, Hon. James F. Conway, mayor of St. Louis, said the situation was so urgent that air-conditioners were flown in from New York by the National Guard.

The reality behind the air-conditioning debate is that for medically vulnerable members of our society, cooling is a medical necessity during periods of very hot weather. As the Center for Disease Control study noted, the lack of air-conditioning can be devastating for such individuals even under seasonably hot weather conditions.

Following the 1980 heat wave, some studies suggested that fans were not useful in reducing hot weather deaths. These observations called into question the value of distributing fans to vulnerable individuals—a strategy which played a central role in many emergency relief programs enacted during the heat wave. Fans are a poor substitute for air-conditioning, but there should be no doubt about their utility. Air movement helps keep a person cool by promoting evaporation, the body's main method of reducing heat stress. Fans are effective at temperatures well above 100° F when the humidity is low, but becomes less effective as humidity rises, since humidity directly interferes with evaporation.

The unfortunate reality behind the 1980 findings on fans is that many people either refused to use their fans or failed to use them properly. Whether through lack of knowledge, fear of robbery, inability to open weatherized windows, or out of concern for higher utility bills, the resulting tragedy was the same.

The cost of operating a 20-inch box fan was $13 per month, a cost that many were obviously unwilling to incur. At the same hearing, Dixie Matthews, director of the Central Arkansas Area Agency on Aging in Little Rock, testified that:

> Some elderly have had their homes weatherized for winter and their windows are permanently puttied shut. Or they are afraid to remove plastic weather-stripping for fear of being unable to afford replacement cost for bitter cold winter weather.

Senator Jim Sasser reported:

> Older people in some areas are afraid to open their windows for ventilation, for fear of being burglarized. In one particularly tragic incident, an older resident of a Memphis housing project was robbed of $91 during the heat crisis. The next night, fear of robbers led her to keep her windows closed. She died during the night, apparently because of the heat.

B. PREVENTING HEAT STRESS

The most dangerous heat wave conditions occur when there is no relief from the heat; when both night- and daytime temperatures remain above 90° F, and when the humidity is also high. Vulnerable

people are quickly worn down under these conditions, and techniques that reduce heat stress can mean the difference between life and death. Any relief from the heat is beneficial, and the combined effects of several cooling techniques can substantially reduce the overall burden on the body. A few techniques for preventing heat stress are discussed below.

1. Acclimatization

It takes time for the body to accustom itself to hot weather. Certain physical changes need to take place before the burden on the heart and blood vessels is reduced. This process of physical adjustment is called acclimatization. Acclimatization is lost at about the same rate at which it is gained, an important point to remember when hot weather follows a week of pleasant temperatures in the middle of the summer.

Many older people do not acclimatize very well to hot weather and have a poor tolerance for sudden jumps in temperature. Individuals with heart conditions, such as congestive heart failure, may not be able to acclimatize at all.

An air-conditioning system failure can be lethal for vulnerable people precisely because they do not have time to adjust to the sudden increase in temperature. Individuals in Northern States often succumb to heat waves for the same reason. Their bodies, accustomed to temperatures in the upper seventies and low eighties, can be physically overwhelmed by a sudden 6-day hot spell with highs in the nineties.

2. Techniques for Keeping Cool in the Heat

During a heat wave, spend as much time as possible in the coolest possible surroundings—whether it's a cooler room in the house, an air-conditioned church, relief center, or public facility. It is not necessary to run a room air-conditioner all the time to obtain relief. Using air-conditioning to keep the temperature below 90° F and the humidity at a reasonable level is an acceptable alternative to the more expensive route of constant operation. Individuals who are particularly vulnerable to heat—including older citizens—should keep at least one room of the home cool, where they can take refuge from the worst of the heat.

Cooling with fans.—Fans must be used properly to provide maximum relief from the heat. Before air-conditioning, people frequently placed large blocks of ice in front of electric fans to provide indoor cooling during the heat of the day. This technique is still used in many parts of the country. Closing windows and drawing drapes or shades in the early morning keeps the cooler night air inside the home. Inside a room, fans should be placed on a table or the floor. When placed in a window, a fan can be used to draw cool air into the house at night.

Attic fans play an important role in keeping attic temperatures at a reasonable level. This can make a substantial difference in the temperature of the rooms below. When properly installed, a strong attic fan can also provide great air circulation throughout the home at night.

Baths and showers.—Cool baths or showers provide amazing relief from the heat. Cool water removes excess body heat 25 times faster than cool air. For best results and comfort, water temperature should be around 75° F—cool rather than cold. Sponge baths are helpful, but

not as effective as showers or tub baths. As an alternative, wet towels can be placed on the body while lying in front of a fan. Warm baths do absolutely nothing to assist the body in keeping cool. They add heat to the body, thus increasing heat stress.

Water.—Because evaporation of moisture from the skin is the foundation of the body's cooling system, large amounts of water are lost to sweat in hot weather. Yet most people do not drink enough liquids. They wait until they feel thirsty, when the body is already low on water, before drinking. The solution to this problem is to drink often, in reasonable amounts, and to drink more than is needed to simply satisfy thirst. People with diseases or medical conditions which involve problems with water balance—especially those who are on medication—should consult a doctor on how much water to drink in hot weather.

Clothing.—Wear as little clothing as possible when indoors. Lightweight, loose-fitting clothing is more comfortable, and does not interfere with evaporation. Use a hat, parasol, or umbrella to protect the head and neck from sun outdoors.

Cooking and eating.—Avoid major cooking during the hotter part of the day. The amount of heat generated by a kitchen stove can be substantial—it's safer and more comfortable to prepare meals during the cooler p ·:on of the day. Hot foods and heavy meals are likewise best avoided during heat waves. Contrary to popular belief, hot or spicy foods have not been shown to help in reducing heat stress.

Salt and alcohol.—Check with a doctor before increasing the amount of salt in the diet during hot weather. Do not take salt tablets without a doctor's advice. Avoid alcohol entirely during heat waves. It can cause the body to loose important water and put a strain on the heart. Alcohol is a drug, and it can seriously interfere with the body's ability to fight the heat.

3. The Early Warning Signs

A cornerstone of prevention is attention to the early warning signs of heat illness. Heat stress causes physical and mental changes which herald the onset of more serious medical problems. You can avoid heat illness by paying attention to these changes. Most people feel hot and uncomfortable during hot weather, and many notice a lack of energy or loss of appetite. These are mild signs, and unless they get worse or last for many days, there is no need to be alarmed. Other signs are more serious. They include:

Dizziness	Chest pain
Rapid heartbeat	Great weakness
Nausea	Breathing problems
Throbbing headache	Mental changes
Dry skin (no sweating)	Vomiting
Diarrhea	Cramps

Should you experience any of these serious signs, seek a doctor's advice or other medical help as soon as possible.

C. PLANNING FOR HEAT WAVES

1. The Need for a Coordinated National Program

That heat stress threatens human life was established decades ago. Only recently, however, has the need for sound community planning to reduce the threat been the focus of national concern.

In a 1972 article for "Environmental Research," Dr. Stanley Shuman of the Department of Epidemiology, School of Public Health, University of Michigan, wrote:

> Not only do the cities fail to plan for the prevention of the adverse effects of heat stress on residents, but during the emergency conditions, the medical facilities and environmental services are easily overwhelmed, the power shortages, lack of air-conditioning, refrigeration, ice, relief areas, or emergency personnel become acute.

Heat stress is a national health problem, and the threat which it poses to the lives of older Americans is not limited to heat waves alone; it encompasses a far broader spectrum of hot weather conditions. Action is needed at the national, State, and community level to insure that the disaster experienced by our Nation's elderly during the summer of 1980 is not repeated in the near future.

Future heat waves are inevitable, and the National Weather Service has repeatedly warned that they cannot be predicted with any degree of precision. These natural disasters are a permanent part of the climate of our country; we must be prepared to act with speed and efficiency when one strikes. Given the special vulnerability of older Americans, and the large number of individuals who are especially vulnerable to heat by virtue of a medical condition or illness, the present vacuum in public health education and planning for heat waves is deplorable.

2. No Planning in 1980

No planning for heat waves took place in advance of the summer of 1980. The Nation was taken by surprise. Unaware of the environmental danger, uninformed about the special vulnerability of the elderly, and lacking specific emergency plans, State and local governments could not deal effectively with the crisis. By the time authorities realized the magnitude of the problem, thousands had died. As one community leader who testified at the joint hearing said:

> We were totally unprepared to deal with the problem. People started dying around us. Ironically, our emergency plan addresses flood, tornado, and fire. There is no mention of drought.

As the heat wave progressed, Federal funds were authorized for cooling assistance. Many communities instituted electric fan distribution programs and opened emergency relief centers where vulnerable individuals could seek refuge from the unremitting heat.

The benefit of these emergency measures was no doubt substantial, but they were no match for the severity of the heat wave. The grim testimony of witness after witness at the joint hearing confirmed that thousands of elderly were either unaware that assistance was available, or were unable to secure help in time. Thousands more, particularly in urban areas, were simply unwilling or unable to leave their

homes when relief centers opened. The net result was a catastrophic loss of life during what may well emerge as one of the largest natural disasters of the century.

3. Community Planning

Development of planned community responses to heat waves must be given top priority. Rapid response capability in dangerous hot weather conditions is vital. It is particularly important that emergency plans be understood and accepted by older people in the community. What good are emergency relief centers if the vulnerable elderly are unwilling to leave their homes? Likewise, the distribution of fans or other cooling devices will have little value if the fear of high bills restricts their use.

High risk individuals and the networks and institutions which serve them must be identified and they must be intimately involved in the educational and planning process. Health care, aging, weather service, emergency management, public safety, social service, agricultural extension, and energy professionals all have a valuable role to play in this process.

4. Research

We have much to learn about the heat. Far more research is needed to expand our understanding of the physiology of heat stress and the climatology of heat waves. At present, the physiological basis of heat stress vulnerability is not understood fully. Further study is needed to define many environmental and physical factors, including the relationship of sex and race, to the potential for heat illness. A Center for Disease Control study of heat-wave-related morbidity and mortality in St. Louis and Kansas City, Mo., for the summer of 1980, found much higher heatstroke rates for nonwhite individuals. Whether this was a factor of race or lower socioeconomic conditions requires further investigation. Results of previous studies concerning sex and vulnerability have yielded mixed conclusions. Further investigation is needed here as well.

More research is also needed to define the climatology of heat waves in the United States, and to identify those communities which are at greatest risk.

The epidemiology of heat waves has not been thoroughly investigated. Many cities known to have been hard hit by heat waves have received only superficial examination, and many others have not been studied at all. Vast gaps exist in our knowledge of the urban and rural morbidity and mortality associated with such disasters. This unfortunate absence of investigative research must be corrected if we expect to plan for future heat waves.

Testimony at the joint hearing and results of scientific studies cause this committee concern for the lives of the frail elderly during heat waves, particularly those residing in non-air-conditioned facilities. The relationship between heat stress and the safety of older Americans in long-term care facilities merits special scrutiny.

Many drugs have the potential to seriously predispose an individual to heat illness, and the relationship of these medications to hot weather safety deserves far greater attention than it has received in the past.

5. Warning System

We need a warning system to alert communities about the onset of dangerously hot weather. Communities were initially unaware of the danger during the summer of 1980 and valuable time was lost. Severe weather warnings are presently issued for many natural weather phenomena, including tornadoes and hurricanes, but not for heat.

6. Mortality Assessment

Today, nearly 3 years after the Great Heat Wave of 1980, detailed mortality statistics are unavailable. How many lives were lost and which cities were hardest hit are still unknown.

We need a national system for rapid assessment of total heat wave mortality. Such a system is vital to the process of assessing the severity of a great national heat wave while it is in progress, and for promptly determining the cost in human life when the heat wave has broken. It would also serve to clarify the national view of hot weather disasters, and provide timely and valuable information for public health research. Such a system should focus on excess deaths from all causes rather than heatstroke deaths alone.

7. Education

A major obstacle to the promise that education holds for reducing heat wave deaths among the elderly is the profound shortage and limited distribution of information on heat stress. While much has been done to remedy this situation in recent years, it is not enough. Despite recent efforts, most people are still unaware of how lethal hot weather can be, and few are familiar with the concepts of prevention. Our uninformed older citizens will be easy prey for the next heat wave unless we do far more to educate them about the danger.

During the past 2 years, under leadership from the Administration on Aging, a partnership of government agencies and private sector companies has worked together in a pilot program to address many of the issues surrounding the heat stress problem. This type of innovative public/private program holds great promise for the future: To encourage research; to further the development of educational material; to assist communities in planning for future heat waves; and to insure a greater level of safety for older Americans during periods of hot weather.

D. NATIONAL MORTALITY IN 1980

Over 20 States were hit by the 1980 heat wave. These are ranked below according to preliminary mortality data available from the National Oceanic and Atmospheric Administration's Center for Environmental Assessment Service. States are ranked in order of the number of fatalities experienced during the heat wave. This ranking was based on heatstroke deaths, a system which understates the total number of excess deaths which occur as a result of heat waves: (1) Missouri, (2) Tennessee, (3) Alabama, (4) Texas, (5) Arkansas, (6) Georgia, (7) Illinois, (8) Kansas, (9) Mississippi, (10) Florida, (11) Oklahoma, (12) Louisiana, (13) Kentucky, (14) Indiana, (15) Nebraska, (16) South Carolina, (17) Iowa, (18) North Carolina, (19) Virginia, and (20) Arizona.

NOTE: During August and September, the heat wave hit many mid-Atlantic and New England States which do not appear in the above listing. At the time of this publication, mortality data for the 1980 heat wave was unavailable for the following States: Delaware, Maryland, District of Columbia, Pennsylvania, New Jersey, New York, Rhode Island, Connecticut, Massachusetts, New Hampshire, Vermont, and Maine. Mortality statistics were recently obtained by this committee for New York City, and the number of fatalities is high enough to rank it 13th on the list of affected States. Clearly this region experienced a substantial mortality which remains to be defined.

When determining the total number of deaths caused by a heat wave, it is particularly important to study excess deaths from all causes rather than heatstroke alone. Excess deaths are the excess number of fatalities above the normal average for the period. Counting only those deaths which have been certified as due to heatstroke results in a large and systematic underestimation of the magnitude of the problem.

1. THE HEAT WAVE OF 1980

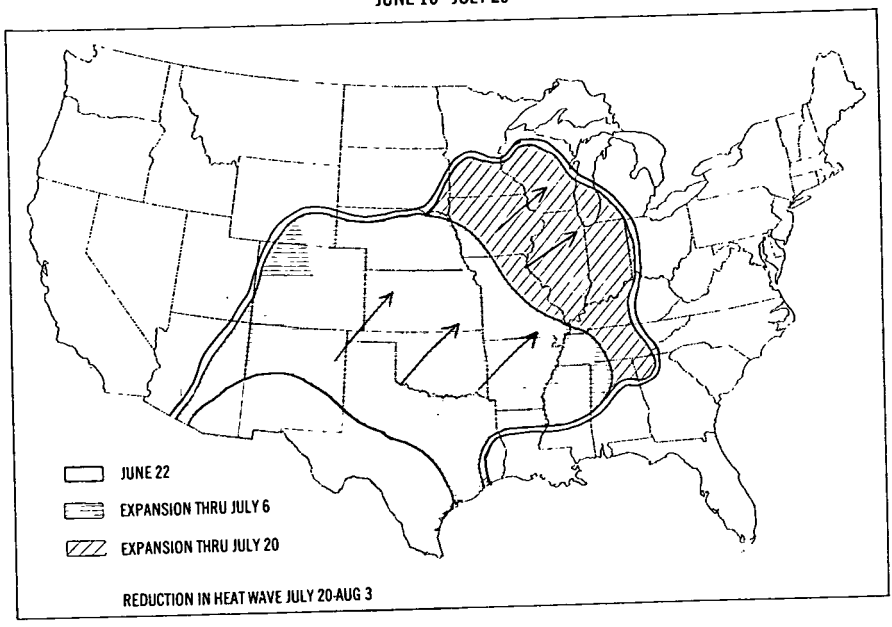
(A) DESCRIPTION

Temperatures began exceeding 100° F in southwest Texas on June 10, and the ensuing string of hot days broke 16 daily maximum temperature records at El Paso. This severe heat, spreading northward from Mexico, initiated the first heat wave stage. Beginning about June 23, 100° temperatures encompassed the rest of Texas and intruded into surrounding States to the north and east. By the first week of July, the center of the heat wave had progressed northward into Oklahoma, and during the second week of the month, the center moved northeastward to Missouri, with most of the central third of the country experiencing 100° temperatures. During mid-July the heat wave spread eastward to the Ohio Valley, but by July 21, a cold front had pushed southward into Texas, Oklahoma, and Missouri and eastward toward the east coast, bringing rain and cooler air to much of the affected region. Temperatures in most of the heat-wave-affected areas dropped to near or slightly above normal during the week ending July 27. However, these temperatures lasted only a short while, for, with the commencement of the second heat wave stage on August 3, temperatures returned to their original intense levels and expanded throughout much of the Eastern United States. A sharp temperature drop occurred during the week ending August 17, but it was short-lived. The following 3 weeks (ending September 7) showed a return to the heat wave pattern. Average monthly temperatures for August were the hottest ever recorded at some locations, and the first week of September saw temperatures 9° F above normal over parts of the Central and Eastern States.

Temperature records were shattered in over a half-dozen States, with many cities setting all-time record highs. On one day (July 13), three cities in the Southeast simultaneously broke their all-time maximum temperature records, with Augusta, Atlanta, and Memphis recording 107°, 105°, and 108°, respectively. In Texas, Dallas temperatures reached 100° each day from June 23 through August 3, and no appreciable rain fell in the State from June 22 throughout July 19.

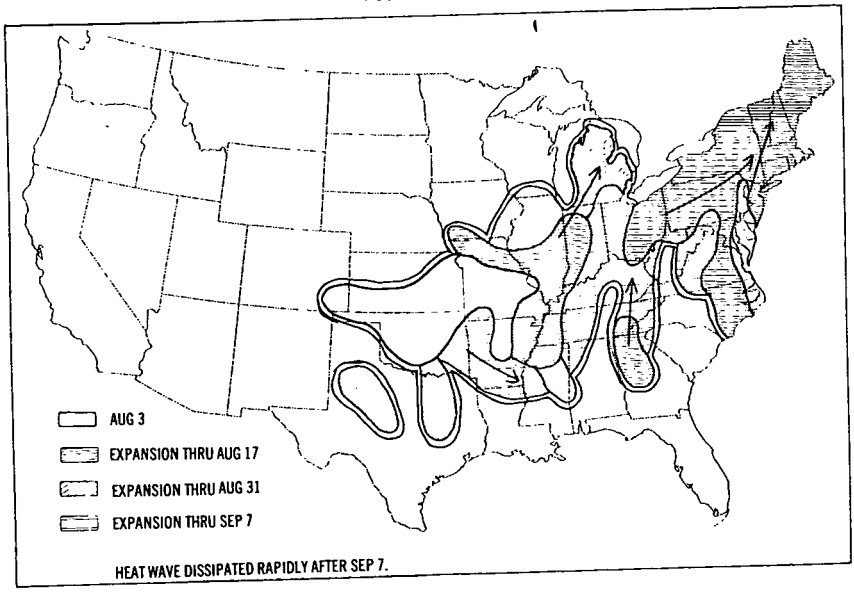
FIRST STAGE OF 1980 HEAT WAVE

JUNE 10 - JULY 20



SECOND STAGE OF 1980 HEAT WAVE

AUG 3 - SEPT 7



APPENDIX

NATIONAL SOURCES OF INFORMATION ON HEAT STRESS

(1) U.S. Department of Health and Human Services,
Office of Human Development Services,
Administration on Aging,
Office for Program Development,
Division of Research and Demonstration,
Model Projects Branch,
300 Independence Avenue, SW.,
Washington, D.C. 20201,
(202) 245-0995.

The Administration on Aging (AoA) is an agency of the U.S. Department of Health and Human Services. As the Nation's chief advocate for older people, AoA touches the lives of over 3.4 million older Americans through its network of 57 State agencies on aging, 674 area agencies on aging, and 13,000 senior nutrition program sites throughout the United States. AoA administers grants programs for the conduct of research and demonstration projects designed to improve the quality of life for older people.

Resources available: Heat stress factsheet and program information. Government and private sector liaison.

(2) American Association of Retired Persons,
Program Department,
1909 K Street, NW.,
Washington, D.C. 20015,
(202) 872-4700.

The American Association of Retired Persons (AARP) is a nonprofit, nonpartisan organization of over 14 million members. AARP is dedicated to helping older Americans achieve lives of independence, dignity, and purpose, and provides a wide range of direct member benefits and services, and a host of community service programs and activities.

Resources available: Factsheet, slide programs.

(3) Energy and Aging Consortium,
P.O. Box 12243,
Arlington, Va. 22209.

The Energy and Aging Consortium (EAC) is a network of 40 diverse national organizations which have joined together to help older Americans cope with rising energy costs.

Resources available: Public service announcement for television (30 seconds).

(4) American Gas Association,
Consumer and Urban Affairs,
1515 Wilson Boulevard,
Arlington, Va. 22209,
(703) 841–8583.

The American Gas Association (AGA) is a national trade organization representing nearly 300 gas transmission and distribution companies which serve 160 million consumers and account for 85 percent of all gas energy delivered in the United States. AGA represents the gas industry on technical and national energy policy issues, and acts as a clearinghouse for information on gas energy.

Resources available: Slide program on hypothermia for general audiences. Heat stress factsheet.

(5) Center For Environmental Physiology,
5632 Connecticut Avenue, NW.,
P.O. Box 6359,
Washington, D.C. 20015,
(202) 363–9575.

The Center For Environmental Physiology is a nonprofit research institute which studies the effects of heat and cold stress. The center provides a variety of program services relating to both subjects to government and industry. The center is presently coordinating the development of a national demonstration program on heat and cold stress with particular emphasis on the health and safety of vulnerable individuals.

Resources available: Research, technical assistance, training, slide programs, factsheet.

(6) National Institute on Aging,
Information Office,
9000 Rockville Pike,
Building 31, Room 5C35,
Bethesda, Md. 20205,
(301) 496–1752

The National Institute on Aging (NIA), is one of the 11 institutes of the National Institutes of Health. NIA conducts and supports biomedical, social, and behavioral research and training related to the aging process and the diseases and other special problems and needs of the aged.

Resources available: Factsheet, research.

(7) U.S. Office of Consumer Affairs,
1009 Premier Building,
Washington, D.C. 20201,
(202) 634–4297.

The U.S. Office of Consumer Affairs (OCA) was established to represent the consumer voice in Government. OCA is now headed by Virginia T. Knauer, who is also Special Adviser to President Reagan for Consumer Affairs. Mrs. Knauer serves as the consumer adviser to the President and directs consumer affairs activity at the Federal level.

Resources available: Special report on heat stress.

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