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Arizona Department of Health Services

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Extreme Weather and Public Health

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Extreme Weather Events and Public Health

Increases in extreme weather events, such as heat waves, heavy rains and flooding, droughts, and storms, have been observed in the past. In general, regional populations adapt to their local prevailing climate through physiological, behavioral, cultural and technological responses. For example: In Phoenix, many people will carry water with them at all times during the summer months. Yet, extreme events can stress populations beyond the adaption limits.

A team of U.S. scientists identified 5 critical health issue related to extreme weather events:

- *Heat-related illness and death*: epidemiological studies have shown a positive association between heat waves and mortality. The risks can be reduced by individual behavioral changes and development of heat preparedness plans.

- *Heath effects related to extreme weather event, such as floods and storms*: The negative health impacts can range from acute trauma and drowning to conditions of unsafe water and post-traumatic stress disorder. Ways to reduce the risk include: continued refinements to public early warning systems, improved engineering for flood control, and enhanced zoning and building codes.

- *Health effects related to air pollution*: Extreme weather conditions may increase the human exposure to air pollutants and therefore, intensify respiratory diseases by damaging lung tissue, reducing lung function, and sensitizing the respiratory tract to other irritants. The health risks can be reduced by improving the early warning systems for air quality, increasing use of mass transit, better urban planning and improving pollution control policies.

- *Water-borne and food-borne diseases*: The quality of water used for drinking, recreation, and commerce can be affected by changes in precipitation, temperature, humidity and wind. Heavy rainfall has been associated with outbreaks of water-borne disease throughout the U.S. Improved surveillance system for infectious diseases can reduced the health risks.

Vector-borne and rodent-borne disease: Vector-borne diseases are weather sensitive. Outbreaks of St. Louis encephalitis have been associated with patterns of warm, wet winters, cool springs and hot, dry summers. The size of the disease-carrying rodent population can change as a result of extreme weather events (for example, increased food supply during flood), which affects transmission of disease such as hanta virus and flea-borne plague. The risks can be reduced by improved surveillance systems, enhanced insect-control programs and vaccine development.

The purpose of the Extreme Weather and Public Health Program is to reduce human health effects related to weather changes occurring throughout Arizona with a focus on vulnerable populations. We will discuss these topics in greater detail in upcoming issues. (Environmental Health Perspectives)

Hot Topics for Arizonans

The hot days just keep coming...

Over the 20th century, average annual temperatures in the Phoenix region increased 3.1°F. Phoenix, Arizona usually experiences 3-4 month heat waves every summer due to high summer temperatures averaging from 98°F to 107°F. Last year, Phoenix, Arizona reached the first 100 degree temperature on May 21, 2010, being 101°F. Within the duration of the summer months, 17 Excessive Heat Warnings (EHW) were issued statewide. In previous years, EHW occurrences in Arizona were as follows: 2009 (11 EHW), 2008 (24 EHW) and 2007 (33 EHW). Raising average temperatures may increase the incidence of heat waves and temperature extremes. Certain populations, such as those with heart problems, asthma, the elderly, the very young, and homeless and those on certain medication can be especially vulnerable to extreme heat.(NWS)

Stay informed by checking the local news for health and safety updates.

Heat-Related Mortality in Arizona

People suffer heat-related illness when their bodies are unable to compensate and properly cool themselves. Zack Guido of the University of Arizona says "compared with more humid regions, the Southwest's dry climate may make heat-related illness more likely because people don't feel uncomfortable until problems such as dehydration have already started." The data shows that heat exposure caused 1,485 deaths in Arizona from 1992 to 2009. The counties with the highest number of deaths due to excessive heat were Pima (624), Maricopa (444), and Yuma (152). 95% of those deaths occurred between May and September, with the highest number of death (589) in July. (ADHS)

Make sure to stay hydrated by drinking plenty of water and keeping yourself and your environment cool.

Annual heat-related deaths in Maricopa County have increased from 2001 to 2008, with peak years being in 2005 and 2006 (80 and 85 deaths respectively). In July 2005, a single heat wave caused 28 deaths in Maricopa County alone, which represented an excess heat-related mortality of 102% in comparison with the corresponding periods from 2000 to 2004. Among all age groups, older adults (age 65 years and older) are at the highest risk. Other populations that are more prone to heat stress include: infant and young children, and people with chronic medical conditions. (MCDPH)

Visit or call elderly people and neighbors during extreme heat events.

Beat the heat: Watch for the signs of a Heat Emergency

Heat Cramps Cause: often occurs during cool-down after activity has stopped	Symptoms: Muscle cramps, pain or spasms in the arms, legs or abdomen First Aid: If you or another individual experiences these symptoms: stop all activity & sit in a cool place; drink clear juice or a sports beverage, or drink water with food; avoid salt tablets
Heat Exhaustion Cause: The body's response to excessive loss of water and salt, usually through sweating. Several days of exposure to high temperatures and dehydration	Symptoms: Slightly elevated body temperature; Heavy sweating; paleness; muscles cramps; tired; weak; dizzy; headache; nausea; vomiting; fainting; cool, moist skin; weak, fast pulse; shallow, fast breathing First Aid: Drink plenty of water or other cool, non-alcoholic beverages; rest in a cool area lying down; take a cool shower or bath; If not treated, can progress to heat stroke
Heat Stroke **(Sun Stroke)** Cause: Most serious heat-related illness– occurs when the body is unable to cool itself down. Can cause death or permanent disability if not treated	Warning signs and symptoms: Body temperature above 103 degrees; red, hot and dry skin (no sweating), strong, rapid pulse; throbbing headache; loss of coordination; confusion; seizures; possible unconsciousness; coma First Aid: Request immediate medical assistance (call 911); move person to a cool, shaded area; remove excess clothing; apply cool water to the person's body via shower or garden hose; do not give victim fluids to drink; if emergency personnel are delayed, call hospital. Source CDC, 2004a

Play it Safe in the Sun
Arizona Heat Illness Prevention School Campaign

Kids are susceptible for high temperatures because: (1) they don't dissipate heat through sweating as efficiently as adults do, (2) they may not know the signs of dehydration, and (3) they don't always drink enough to replace the fluid they lose in sweat. When caught up in a game, kids are likely to ignore their thirst and, unfortunately, supervising adults may fail to remind them. Like sun burn and bug bites, heat-related illness can be prevented if we know steps that should take to keep the kids adequately hydrated.

With the help of Maricopa County school nurses, the heat prevention program will launch the "Arizona Heat-Related Illness Prevention" school campaign in August. Health education materials and activities targeted to school kids will be used to promote healthy behaviors into adulthood, such as importance of staying hydrated. The aims of the program are to reduce the number of heat related illnesses among children and missed school days due to heat health issues. (Curr Sport Med Rep)

Know the Heat Index

Heat index is a measure of the combined effects of heat and humidity. With high temperatures and high humidity, the body is much less able to cool itself property. Get the current and forecast heat index from: (1) local TV weather broadcasts, (2) NOAA Weather Radio, or weather websites like weather.gov (National Weather Service). Sign up to receive free weather alerts to your phone or e-mail at www.weather.com.

Be alert for heat dangers when: (1) Temperature > 90 °F or (2) Heat index > 95°F

Heat Index Chart

ADHS 2011; http://lwf.ncdc.noaa.gov/oa/climate/online/ccd/avgrh.html

Extreme Danger | Danger | Extreme Caution | Caution | Most common in AZ

	RELATIVE HUMIDITY (%)																				
	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
140	125																				
135	120	128																			
130	117	122	131																		
125	111	116	123	131	141																
120	107	111	116	123	130	139	148														
115	103	107	111	115	120	127	135	143	151												
110	99	102	105	108	112	117	123	130	137	143	150										
105	95	97	100	102	105	109	113	118	123	129	135	142	149								
100	91	93	95	97	99	101	104	107	110	115	120	125	132	138	144						
95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136				
90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91
75	69	69	70	71	72	72	73	73	74	74	75	75	76	76	77	77	78	78	79	79	80
70	64	64	65	65	66	66	67	67	68	68	69	69	70	70	70	71	71	71	71	71	72

Heat Index: 130+ degrees F	Health Effect: Heatstroke/sunstroke is highly likely with continued exposure Recommendations: Avoid strenuous outdoor activity;Stay indoors in an air conditioned facility; stay well hydrated; check on your family, friends, and neighbors
Heat Index: 105-129 degrees F	Health Effect: Sunstroke, heat cramps and heat exhaustion are likely. Heat stroke is possible with prolonged exposure and/or physical activity Recommendations: Avoid strenuous outdoor activity; Stay indoors in an air conditioned facility; stay well hydrated
Heat Index: 90-104 degrees F	Health Effect: Sunstroke, heat cramps and heat exhaustion are possible with prolonged exposure and/or physical activity Recommendations: Limit strenuous outdoor activity; Limit your time outdoors; stay well hydrated
Heat Index: 80-89 degrees F	Heat Effect: Fatigue is possible with prolonged exposure and/or physical activity Recommendations: Limit your time outdoors; stay well hydrated