EXERCISING IN COLD WEATHER

Excerpt from TOTAL FITNESS – U.S. Edition by Vincent Antonetti, Ph.D.

The ideal exercise temperature range is about 40 to 85°F with a wind speed less than 15 mph, but many people continue to exercise outdoors at temperatures well below 40°F. Generally, cold weather is less hazardous to an exerciser – but definitely not risk-free. When you exercise outdoors in cold weather you encounter an entirely new set of difficulties. Besides often-dangerous footing on snow-covered or icy surfaces, you must contend with low temperatures and the wind.

Wind Chill Temperature Index

Basic physics states that when heat leaves an object the temperature of the object drops. The same principle applies to your body. As heat leaves your body, your temperature drops and you feel cold. Very low ambient temperatures combined with the wind increase the amount of heat leaving your body. As the wind speed increases, the temperature of any exposed skin drops even further. The Wind Chill Temperature Index was developed in an effort to quantify this phenomenon, and is a measure of the relative discomfort due to combined cold temperature and wind. In essence, the wind-chill temperature lets you know what the outside air temperature "feels like," based on heat loss from skin exposed to low air temperatures and the wind.

In 2001, the U.S. National Weather Service and Environment Canada jointly issued a new Wind Chill Temperature Index. Table 1 (on the next page) presents a version of the Wind Chill Temperature Index issued by the U.S. National Weather

Service. (The wind chill-temperatures in Table 1 are in degrees Fahrenheit and the colors in the table correspond to those in the risk categories shown in Table 2.) Note that exposure to bright sunshine helps, because the sun can increase wind-chill temperatures by 10 to 18°F. The combination of low air temperatures and increasing wind speeds can result in incredibly low wind-chill temperatures. For instance, Table 1 shows that an air temperature of -30°F and a wind speed of 40 mph produces a wind-chill temperature of -71°F. Now that's cold! And dangerous!

Air Temp (°F)	Wind Speed (mph)											
	0	5	10	15	20	25	30	35	40	45	50	55
40	40	37	34	32	31	29	29	28	27	26	26	25
35	35	31	27	25	24	23	22	21	20	19	19	18
30	30	25	21	19	17	16	15	14	13	12	12	11
25	25	19	15	13	11	9	8	7	6	5	4	4
20	20	13	9	6	4	3	1	0	-1	-2	-3	-3
15	15	7	3	0	-2	-4	-5	-7	-8	-9	-10	-11
10	10	1	-4	-7	-9	-11	-12	-14	-15	-16	-17	-18
5	5	-5	-10	-13	-15	-17	-19	-21	-22	-23	-24	-25
0	0	-11	-16	-19	-22	-24	-26	-27	-29	-30	-31	-32
-5	-5	-16	-22	-26	-29	31	-33	-34	-36	-37	-38	-39
-10	-10	-22	-28	-32	-35	-37	-39	-41	-43	-44	-45	-46
-15	-15	-28	-35	-39	-42	-44	-46	-48	-50	-51	-52	-54
-20	-20	-34	-41	-45	-40	-51	-53	-55	-57	-58	-60	-61
-25	-25	-40	-47	-51	-55	-58	-60	-62	-64	-65	-67	-68
-30	-30	-46	-53	-58	-61	-64	-67	-69	-71	-72	-74	-75
-35	-35	-52	-59	-64	-68	-71	-73	-76	-78	-79	-81	-82
-40	-40	-57	-66	-71	-74	-78	-80	-82	-84	-86	-88	-90

Table 1: Wind-Chill Temperature vs. Air Temperature & Wind Speed

One of the potential consequences of very low wind-chill temperatures is frostbite. Table 4.9 (on the next page) employs the Canadian interpretation of frostbite risks rather than the

U.S. version. (After all, who knows more about cold weather than Canadians?) Other serious cold weather related conditions are hypothermia and heart attack.

Frostbite

When body tissue freezes the injury is called frostbite, which usually strikes fingers, toes, nose and ears. Frostbitten skin is numb, hard and pale, and requires immediate medical attention. If you suspect you have frostbite, get indoors as quickly as you can and call or send for help. First aid steps include covering the frozen area with a blanket and drinking a warm nonalcoholic beverage.

Wind Chill Temperature	Frostbite Risk Most People	Exposure Time
40°F to -17°F	Low	---
-18°F to -34°F	Medium	10 to 30 minutes
-35°F to -53°F	High	5 to 10 minutes
-54°F to -64°F	Higher	2 to 5 minutes
-65°F to -90°F	**Highest**	**2 minutes or less**

Table 2: Frostbite Risk vs. Wind-Chill Temperature

Hypothermia

Prolonged exposure to extreme cold, especially during exercise, can result in a depletion of energy stores (calories) which can cause a drop in body temperature. This in turn can cause gradual mental slowing. The stricken person becomes increasingly unreasonable, clumsy, irritable, sleepy, and eventually lapses into a coma. This is a life-threatening condition. Severe hypothermia can lead to cardiac and respiratory failure and death. To help, your first move should be to call 911. Then start first aid (which is beyond the scope of this article).

Heart Attack

As the air temperature drops, your body's air-warming system may not be able to adequately heat the cold air entering your mouth and flowing down your windpipe. As a result, the incoming cold air may cause your coronary arteries to constrict – resulting in a heart attack – particularly if you are not in good condition.

Cold Weather Outcomes

Once the wind-chill temperature reaches approximately 10°F exercising outdoors becomes increasingly uncomfortable. Even if you are an outdoor enthusiast, at this wind chill you may want to think about changing to an indoor exercise routine until the weather moderates.

At a wind-chill temperature of approximately -17°F the risk of frostbite starts to increase. Unless you are skiing cross-country or downhill, or engaged in another winter sport that requires you to be outdoors, in bitterly-cold weather, the best advice is to exercise indoors. Furthermore, it is not a good idea to exercise outdoors when the wind-chill temperature is below -20°F. At this wind chill temperature any exposed skin will freeze in about 10 minutes.

In brief then, even if you are relatively young and in very good condition, rather than exercising outdoors in very cold weather, consider joining a health club, setting up a small workout space at your home, or walking in an enclosed mall.

Dressing for Cold Weather

Notwithstanding our best advice, if you still intend to exercise outdoors in frigid weather, wear layers of loose-fitting, lightweight, warm clothing. The layer closest to your skin should be a thin layer of a synthetic wicking material that draws perspiration away from your body. The second layer should provide insulation. Water-resistant fleece is a good option. Your third, outer layer, should be windproof and waterproof with a hood. Generally, mittens are warmer than gloves, and wool or polypropylene socks insulate and wick moisture. Wear a head sock that covers your entire head and

neck with openings only for breathing and vision. Consider covering your mouth with a scarf to cause the air you breathe to be slightly warmer and more humid. Further, wear goggles or wraparound sunglasses to protect your eyes from wind and ultraviolet radiation. And make sure to stay dry.

In addition, remember to drink plenty of water – even in cold weather – to make up for water you lose when you sweat during vigorous exercise.

The preceding excerpt is from:

TOTAL FITNESS – U.S. Edition by Vince Antonetti, Ph.D.

Readers outside the U.S.A. would probably prefer one of the following eBooks also published by NoPaperPress:

- **TOTAL FITNESS – Metric Edition by Vince Antonetti, Ph.D.**
- **TOTAL FITNESS – U.K. Edition by Vince Antonetti, Ph.D.**