

## Modest treatment yields heartfelt benefits

Educational and counseling efforts aimed at pumping up the physical health of heart attack survivors may benefit from an unassuming maxim: Less is more. A year-long stress-monitoring program for men recovering from heart attacks, relying on monthly telephone interviews and home visits by nurses when necessary, produced substantial reductions in the incidence of subsequent heart attacks, according to a report in the September-October *PSYCHOSOMATIC MEDICINE*.

Moreover, during the experimental program and for one year after it ended, subsequent attacks were less likely to be fatal in program participants than in recovering heart attack patients receiving only comprehensive yearly medical checkups.

The long-term benefits of the stress-monitoring approach match those reported for more time-consuming and costly measures for heart disease patients, such as intensive counseling to alter Type A behavior, say study directors Nancy Frasure-Smith and Raymond Prince of McGill University in Montreal. What appears crucial, they maintain, is regular emotional support in the months following a heart attack, when recovering patients find stress particularly difficult to handle.

The treatment devised by Frasure-Smith and Prince is "new, exciting and innovative," writes psychologist Lynda H. Powell of Yale University School of Medicine in the same journal. Replications of the Canadian study will indicate whether sweeping educational and Type A counseling programs are "examples of overkill," says Powell, who studies Type A behavior.

The McGill scientists randomly assigned 539 men recovering from heart attacks to either the experimental or control group. A total of 461 agreed to take part in the study, and 405 provided data for a follow-up five years later. Most had suffered only one heart attack before entering the study.

Patients in the experimental group got a phone call once a month for one year from an interviewer who administered a 20-item stress questionnaire. If the patient reported five or more symptoms, or if he temporarily reentered the hospital at some point, a coronary care nurse paid him a visit at home. Nurses did whatever they felt necessary to help relieve stress. Most commonly, they discussed implications of chest pain, shortness of breath and fatigue, as well as focusing on symptoms of anxiety and depression. They also provided information about heart disease and Type A behavior. Each nurse consulted weekly with other nurses, a psychologist, a psychiatrist and the telephone interviewer.

Half the stress-reduction group received visits by a nurse, and these required an average of five to six sessions, each lasting an hour.

One year after the stress-monitoring program ended, 19 men in the control group had died of a heart attack outside of the hospital, compared with nine men in the experimental group. The program apparently helped to decrease the number of sudden deaths from heart attacks, the researchers contend.

An average of four years after the program ended, 60 controls had suffered

another heart attack, compared with 43 men in the experimental group.

Although the health advantages for the experimental group are statistically significant, the researchers acknowledge a major drawback to their study. After some of the subjects dropped out of initial random treatment assignments, the control group was left with a larger proportion of men of low social class, as measured by education, occupation and income, than the experimental group. Lower-class patients may have been more reluctant to accept the added burden of participating in the stress-monitoring program, the researchers suggest.

— B. Bower

## Earthquake leaves Bay area still vulnerable

The destructive quake that killed hundreds of people in the San Francisco Bay area this week has *not* relieved most of the stress stored in the Earth there, leaving the region threatened by an even more destructive shock that may strike anytime in the next few decades, experts warn.

"This is not the big earthquake," says David Russ, assistant chief geologist at the U.S. Geological Survey (USGS) in Reston, Va. In the long run, Russ says, scientists remain concerned over the threat from the San Andreas and other faults in heavily populated parts of the Bay area.

The Oct. 17 jolt, which registered a magnitude of 6.9 on the Richter scale, broke the section of the San Andreas fault that runs through the Santa Cruz mountains, about 80 kilometers southeast of the city of San Francisco and 16 km northeast of Santa Cruz. Seismologists estimate the quake was centered approximately 15 km below the surface.

More than 1,000 km long, the San Andreas fault is divided into sections, and scientists believe that earthquakes break only one or a few connected sections at a time. The Santa Cruz mountain portion, 35 km long, was the southernmost to move in the great 1906 San Francisco earthquake. That shock also broke two sections to the north, including one that runs just west of San Francisco.

Russ says he is not aware of any precursory signs appearing in the days before this week's jolt. However, scientists had been keeping close watch on this part of the San Andreas. Within the last 17 months, the region generated two smaller shocks: a magnitude 5.2 on Aug. 8, 1989, and a magnitude 5.1 in June 1988.

Coming after many decades of quiescence, those two temblors signaled that strain was again building on this section and that a larger quake might be imminent (SN: 8/19/89, p.119). In 1988, a group of experts issued a report for the USGS in which they calculated a 30 percent probability that this section of the San Andreas

would cause a magnitude 6.5 quake within the next 30 years.

Although this week's quake was the largest in the area since 1906, it did not release the energy stored in sections of the San Andreas closer to San Francisco or in other Bay area faults. These great fractures in the Earth mark an area where the northwest-moving Pacific crustal plate grinds past the North American plate. Instead of sliding smoothly past each other, the plate edges stick together until enough stress builds to rupture the faults, causing an earthquake.

One of the most threatening faults, called the Hayward, runs east of San Jose and northward through the cities of Oakland and Berkeley. "Segments of the Hayward fault remain some of our highest concern. It's been quite a long time since we've had a damaging earthquake there," Russ says.

The USGS report last year estimated a 50 percent chance that the Hayward or the San Francisco section of the San Andreas would generate a magnitude 7 earthquake in the next 30 years. Since these faults run near large cities, they could cause even more damage than this week's shock.

The USGS report says southern California faces an even higher chance of a large earthquake in the next few decades. There is a 60 percent probability that the southern San Andreas will cause a magnitude 7.5 to 8 earthquake in the next 30 years. Because the magnitude scale is logarithmic, a magnitude 8 quake is 10 times stronger than a magnitude 7.

In the next few weeks, as the Earth readjusts itself in the wake of the main shock, thousand of aftershocks, ranging from imperceptible to perhaps as large as magnitude 6 will shake the Santa Cruz area. Some of the larger ones may further damage already-weakened structures. USGS seismologists are setting out portable recording instruments to track the aftershocks, which will help them define the specific region that slipped during the main shock.

— R. Monastersky