of complete remission are disease-free at least four years later suggest that two and a half years after complete remission is the optimal time for most patients to stop therapy. In other words, if they stayed on intensive therapy for longer than two and a half years, they would probably receive no benefit and would undoubtedly suffer undesirable side effects. True, the 20 to 30 percent who would eventually relapse without further therapy might benefit from it, but there is currently no way to identify these patients at the time that therapy is stopped. □

The great blizzard: A mind-blower

A mother and her four sons live in a small but cozy beachfront cottage on the Massachusetts coast. The father had died of cancer a year earlier. Then, the great blizzard of '78 wipes away the home and most of the family's other possessions. For the next few weeks, the group huddles in a stark motel room. The mother reverts to alcoholism and is admitted to a psychiatric hospital while the children get into various scrapes in the neighborhood.

This story has a happy ending — the mother licks her drinking problem, the family is reunited and obtains federal funds to rebuild on their old property. But it is a graphic reminder that blizzards, hurricanes, floods and other natural disasters can trigger far more than physical devastation among their victims.

The onset of emotional problems — particularly depression and sleep loss — "can and does happen to 'normal' people who are not on the rolls of psychiatric clinics," says Calvin Frederick, chief of the National Institute of Mental Health's Disaster Assistance and Emergency Mental Health project. However, such difficulties more often strike the "more vulnerable" members of society, primarily children and the elderly, he says. "People are less able to cope during a disaster," says Frederick. "Their usual guideposts are threatened and their dependency heightened — they realize their helplessness."

A survey of 115 storm victims who were helped by the NIMH-funded Project Concern program of the Massachusetts Department of Mental Health showed that 84 percent felt they had experienced emotional problems that would not have occurred if the storm had not hit. About 60 percent said they experienced depression or anxiety problems and more than one-third had trouble sleeping or controlling their tempers.

Frederick emphasizes that in many cases, the depression is of the serious, "clinical" variety and occurs in persons who might not actively seek out professional help. Many of those treated in Massachusetts were identified and referred by "outreach contacts" such as churches and small business organizations, where a person's financial problems often exposed emotional ones. For most, the difficulties faded shortly after physical recovery from the blizzard, but for others problems persisted for months beyond.


Project Concern

Such symptoms appear to accompany all major disasters, Frederick says. And he suggests that individuals and families might help prevent emotional problems by running through drills, similar to fire drills, before the storm or flood hits. Family members should meet among themselves and with neighbors and "talk openly about the tension and anxieties they should expect," Frederick says. "They should rehearse their feelings to some extent, imagine how it's going to be ... think about the worst. That's good mental hygiene." □

Muons: Does the flavor keep?

Flavor is that certain *je ne sais quoi* that makes basil different from bay. Restaurant critics can — or claim they can — follow basil or bay from leaf to finished sauce, and they pontificate sagely about soupçons of tarragon or too strong a statement of shallots. "Flavor" has been imported into the terminology of particle physics to serve as a name for the ineffable I'm-not-sure-what that makes a given particle what it is on the most fundamental level. Flavor, or rather difference of flavor, is what makes a charm quark a charm quark and not a strange quark. It is what makes a muon a muon.

The importance of being muon can be approached from two directions. The first is that of experimenters, who, in working with muons, found that muons avoid certain routes of radioactive decay. To put it shortly, the muon always decays to an electron, an electron neutrino and a muon neutrino (which shares the flavor of muonness). The muon never decays into three electrons or combinations of electron and gamma rays that are allowed by other applicable rules.

An empirical law of muon number conservation was thus established. Muonness could not get lost. It is almost impossible to prove a negative experimentally, and so experimenters continue to test the empirical law. About a year ago a hint that some of the gamma-ray decay modes had been seen came from the DESY laboratory in Hamburg. Not much has been heard of that hint since, but it gave a sharp stimulus to discussion of muonness. In the Feb. 26 PHYSICAL REVIEW LETTERS 17 physicists from the Los Alamos Scientific Laboratory, The University of Chicago and Stanford University (J. D. Bowman, et al.) present experimental results that are a strong support for conservation.

They used the Clinton P. Anderson Meson Physics Facility at Los Alamos, which was designed to provide copious fluxes of muons. They were able, in a reasonable time, to observe 36 billion decays of positively charged muons. They report no instances of decay into electrons and gamma rays. They calculate that if there are any such decays, they are fewer than 2 in 10 billion of the electron-neutrino-neutrino variety. They give a statistical confidence of 90 percent to the result.

The second significance of muonness is theoretical. Theoreticians are the people who are supposed to provide the reasons for things experimenters find. One of the things they have been working toward is a unified field theory that would explain everything in physics as arising from the fundamental nature and geometry of the universe. As they apply that geometry, they seem to be moving in varying ways toward a general law of Conservation of Flavor, which would demand that no matter what mixings, churnings or transmutations went on in a physical process, the flavors that went in at the start were discernible at the end. The law would apply to all flavors in physics and would pick up the empirically determined rule of conservation of muonness and give it its place in a much bigger picture.

But as a number of theorists now see it, conservation of flavor should not be absolute when applied to muonness, but slightly broken. Slightly broken conservation laws, rather than the absolute ones of the past, are of special philosophical interest. They are related to the slightly broken symmetries that are the mathematical foundations of these theories. Ratios of neutrinoless to neutrinoful decay paths of one in 100 million or greater are generally predicted. The discrepancy between the Los Alamos experiment and these predictions is enough to suggest further work, by theoreticians, experimenters or probably both. □