

# SPECIAL REPORT: WORLD HEALTH DAY 1987

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## IMMUNIZATION: A CHANCE FOR EVERY CHILD

*World Health Day commemorates the date 7 April 1948 when the Constitution of the World Health Organization was adopted. The theme of World Health Day 1987 reflects the stark fact that millions of children die each year in the Third World, and countless others are disabled, as a result of vaccine-preventable illness. The accounts that follow, as well as the Director's Letter on page i, direct attention to this problem and to the work of the Expanded Program on Immunization created by WHO in 1974 to afford protection against six childhood diseases.*

## WORLD HEALTH DAY MESSAGE

**Dr. Halfdan T. Mahler, Director-General  
of the World Health Organization**

We have within our reach a challenging goal set in 1977 by the health parliament of nations, our World Health Assembly, to provide immunization for all the children of the world by 1990.

There is, however, no room for complacency. I have decided to devote World Health Day 1987 to immunization because much more still needs to be done within the countries themselves. No matter how generous external support may be, nothing can replace the active participation of individuals and their communities, of national leaders and their government structures.

Planet earth can no longer accept that, in the age of modern technology, children should still die by the millions from diseases which can be prevented by available vaccines.

Since we launched the WHO Expanded Program on Immunization in 1974, moving forward with the strengthening of primary health care, there have been major public gains. The lives of some 800,000 infants are saved every year in developing countries where child, vaccine, and health worker can be brought together. The World Health Organization is particularly grateful to UNICEF, whose active support to achieve universal child immunization by 1990 has been, and will remain, of critical importance for the success of this program.

Immunization is truly a chance for every child. The informed cooperation of the people, the unwavering commitment of leaders, the devotion of health workers, the loving care and intelligent interest of parents, and the raising of necessary funds and materials are the vital ingredients needed to give life to all children of the world.

## THE EXPANDED PROGRAM ON IMMUNIZATION: A REVIEW

Some five million children were dying each year, and another five million were being disabled, by six childhood diseases—almost all in developing countries. Even though vaccines existed against these diseases, and had for years, less than 5% of the infants in developing countries were immunized. Another disease, smallpox, was on the verge of being wiped out—an example of an immunization drive that was working. It was against this background that the World Health Assembly, the governing authority of the World Health Organization (WHO), met in 1974.

If smallpox, an ancient scourge, could be conquered with immunization, it was asked, why not measles, polio, and tuberculosis? Why not diphtheria, pertussis, and tetanus? There was no need to search for “perfect vaccines,” the delegate from Tanzania said, because “those already available are known to be effective.”

As WHO experts saw it, the challenge was to mobilize not only health officials but also opinion leaders in the community—politicians, journalists, religious figures, teachers, and even the police—in a massive immunization program. Delegates from around the world agreed. The delegate of the German Democratic Republic urged that “the experience gained should be used in the control of other communicable diseases . . . from which millions of children die in developing countries.”

### 1974: Expanding Coverage and Services

The delegate of Poland proposed “an expanded program on immunization in every country.” That meant expanding coverage and, in particular, expanding services to reach the neglected—

the urban poor and rural dwellers. It meant immunizing newborn babies during their first critical year of life, when half of all deaths are estimated to occur. And it meant teaching management skills to health workers so they could organize the stepped-up work needed to go from routine to expanded immunization.

The delegate of the Netherlands (on behalf of Ethiopia, India, Poland, Qatar, Somalia, the United States, and Venezuela) spelled out these measures in a subsequently adopted resolution that called upon countries to "develop or maintain immunization and surveillance programs against . . . diphtheria, pertussis, tetanus, measles, poliomyelitis, and tuberculosis." When a subsequent World Health Assembly set 1990 as the target date for protecting children against these killers, the immunization program was on its way.

The problems seemed insurmountable at that time. Not only was immunization negligible in most developing countries, but reporting was inadequate and there was little awareness of the extent of the toll being taken by the target diseases. Moreover, there was virtually no understanding of the procedures needed to keep vaccines fresh and usable. In most Third World countries, where electricity often failed or fluctuated, refrigerators broke down constantly, and safe transport methods were rarely found.

In just over a decade all that has changed. The proportion of infants immunized in many of the largest developing countries now ranges from 20% to 90%—partly because of "national immunization days," but mainly because communities have pledged themselves to the 1990 goal, with presidents and prime ministers often setting the example. India has administered antituberculosis (BCG) vaccine to 65% of all one-year-olds; vaccine against diphtheria, pertussis, and tetanus (DPT) to 51%; and vaccine against polio to 37%. In Brazil the respective percentages vaccinated with BCG, DPT, polio, and measles vaccines are 75%, 67%, 58%, and 30%; and in the Philippines they are 76%, 61%, 58%, and 30%. In addition, eradication of wild poliovirus has been targeted in both Europe and the Americas.

Most significantly, a "cold chain" has been established to keep vaccines below 8°C (46°F) from manufacturer to child, and tens of thousands of health workers have been trained in the techniques needed to manage this vaccine lifeline.

## 1987: A Chance for Every Child

To give the immunization program added impetus and highlight the need for accelerated efforts, WHO has chosen "Immunization: A Chance for Every Child" as its theme for World Health Day 1987. "At present, no committed country with a realistic immunization program needs to be constrained by a lack of vaccine, cold chain equipment, or supplies," says Dr. Halfdan Mahler, the Director-General of WHO.

The cost of immunizing a child against all six diseases ranges from US\$5 to \$15; the countries involved bear close to 80% of this cost. But financial support from international agencies, national agencies, and private organizations has increased. Italy has pledged US\$100 million for the program, and Rotary International has pledged US\$120 million for its "PolioPlus" campaign. UNICEF has become a major vaccine supplier, providing vaccines and refrigerator equipment worth more than US\$50 million alone in 1986 at prices below wholesale. It also sponsored a 1985 declaration calling for universal child immunization by 1990, and has come to play a key role in promoting immunization goals.

Still, much remains to be done. The roughly 30% rate of "dropouts" who fail to receive their third doses of DPT and polio vaccines needs to be reduced; emphasis needs to be switched from providing immunization coverage to reducing disease incidence—especially the incidence of measles, polio, and neonatal tetanus; and more workers need to be trained in management techniques. Nonetheless, most Third World countries are expected to meet the goal set for 1990. About 10—afflicted by wars or famine in Africa and the Eastern Mediterranean—are likely to fall short. However, the aim of protecting all children remains unchanged, and that aim is within reach; for the fact remains that if 80% of the children in any given area are fully immunized, then the six targeted diseases should be on their way to oblivion.

## THE COLD CHAIN, LIFELINE FOR IMMUNIZATION

The international drive to immunize children in the developing world is turning into a US\$25 million a year business for industrialized countries, according to Pan American Health Organization and World Health Organization estimates. While developing countries are increasingly expected to share in this market, thus far about 85% of the equipment—some 110 products—used to keep vaccines safe and potent from the manufacturer to the child are produced in the industrialized world. The major producing countries are Denmark, Italy, Luxembourg, Sweden, and the United States.

Among the items produced are cards that monitor vaccine temperatures, syringes, cold boxes, and refrigerators

run by kerosene or powered by the sun. These items are indispensable to the "cold chain" that permits safe transportation of vaccines—for example, by boat to the outer islands of Indonesia, by camel through the Sahara, or across the mountains of Yemen. This chain is the lifeline of the PAHO/WHO Expanded Program on Immunization, a program that seeks to protect all the world's children against measles, diphtheria, pertussis, tetanus, polio, and tuberculosis by 1990.

## The Refrigeration Problem

When this program was launched in 1974, vaccinators in the Third World faced a host of difficulties that centered mostly around refrigerators. Not built for tropical countries, the refrigerators then in use were inadequately insulated and broke down all too frequently, thereby putting the efficacy of the vaccines stored in doubt.

A survey of conditions at the time showed not only a need for equipment suited to the developing world, but also a lack of recognition that immunization programs depended on maintaining vaccines at the right temperatures.

The fact is that the vaccines available for use in the expanded program lose potency if exposed to excessive light or heat. Polio vaccine is the most sensitive; measles is next, followed by BCG (the vaccine against tuberculosis), DPT (the combination of diphtheria, pertussis, and tetanus vaccines administered to children), and tetanus vaccine administered to pregnant women. All these vaccines must be stored at temperatures below 8°C (46°F), and DPT and tetanus vaccines must also be kept from freezing.

"We now know that thousands of children were being immunized with ineffective vaccine," recalls John Lloyd, a WHO technical officer who worked over the years helping to create the cold chain. An airport is usually the first stop for a batch of fresh vaccine from the manufacturer. But though marked "Rush, Store Below 8°C," vaccine crates could sit all day in a roasting-hot customs shed before being picked up. And even while in refrigerated storage in a capital city, vaccines could be affected by power cuts and voltage fluctuations. In addition, they were subject to delays (e.g., from truck breakdowns) and carelessness in handling during transport from provincial to district levels, to small health centers, or to vaccination sites in a distant village. "The flaws in the cold chain were a major obstacle to immunization," says Dr. Ralph Henderson, Director of the WHO program.

That is no longer so, for two reasons: First, WHO officials put to use equipment already on the market; they modified equipment found; and they designed equipment—some 50 items in

all—specifically for the cold chain. Second, they produced manuals and set up courses that have trained tens of thousands of health personnel—among them storekeepers, nurses, doctors, and virtually every type of health worker along the cold chain—in management techniques. “Equipment is certainly much less of a problem than when we started,” says James Cheyne, another WHO technical officer who was present during the early days of the cold chain. “Management is the biggest problem. What we need now are the skilled people to make sure that the vaccines arrive in the right quantities at the right time.”

## Cold Chain Monitor

A major innovation is the vaccine cold chain monitor, a time-temperature card measuring about 12 cm by 15 cm that is included with every 3,000 doses of vaccine shipped from the manufacturer. A strip of chemically treated white paper on the card, showing through three windows (A, B, and C), turns progressively bluer the longer it is exposed to temperatures higher than 10°C. A second indicator, a disk (D), does the same after about two hours of exposure to temperatures above 34°C.

This monitor indicates whether the cold chain has remained cold and whether polio, measles, DPT, and BCG vaccines are usable. (Polio vaccine must not be used without testing if window A is blue; measles vaccine must be used within three months if window B is blue, and not at all if window C is blue. None of the vaccines can be used if all the windows are blue.)

This warning strip is made by the 3M Company of St. Paul, Minnesota. Some 150,000 cards are being shipped each year, until recently at a cost of some US\$3 each, but now (largely because of volume increases) at about US\$1 each.

Contributors to the financing, testing, and development of cold chain equipment include Denmark and the Japan Shipbuilding Industry Foundation (both major contributors), as well as Finland, the Netherlands, Sweden, and the United Kingdom. The main center for testing cold chain equipment and products is Univalle at the University of Valle in Cali, Colombia.

Immunizations are being carried out now in all countries of the world. As the demand for equipment increases, WHO and UNICEF (the latter buys approximately 60% of all the equipment) seek to improve designs and lower costs. The following are a few of the 136 innovations listed on the WHO/UNICEF Cold Chain Product Information Sheets:

- A plastic, single-dose syringe for immunization against tuberculosis. Before its development, twenty-dose glass syringes were employed. The plastic version is unbreakable, less expensive, and easier to use. Also, because it is a one-shot syringe, the risk that it might spread hepatitis in children—an important risk with the other syringe—is practically nil.

- Cold boxes, some 33 types in all, are produced in both the developing and industrialized worlds. They include polyurethane-lined boxes with capacities to transport from 2,000 to 10,000 doses of vaccine for as long as 10 days at temperatures as high as 43°C (109°F). Previously, ordinary picnic boxes were often used. Coper Glass of Brazil and Industrias Keyton of Colombia are two manufacturers producing this new generation of cold boxes.

- Refrigerators are now being made that operate on kerosene or liquid gas, and that have the capacity to hold a month's supply of vaccine for 100,000 people.

- Testing has just been completed for a new fiberglass wick to use in kerosene refrigerators, one that can burn for at least two years. A cotton wick only burns for about three months.

- Solar powered refrigerators show promise of eventually replacing fuel-consuming types.

- An alarm system is now available to warn workers when the temperature in a storage room rises above 10°C (50°F).

## PAHO'S GOAL: NO POLIO IN THE AMERICAS BY 1990

Poliomyelitis, a contagious disease caused by the poliovirus, is the major cause of lameness in many developing countries. Despite the availability of an effective and inexpensive vaccine, over 300,000 children the world over are disabled each year by polio. From 1969 through 1986, well over 50,000 cases of this disease were reported in Latin America alone. The burden imposed by paralytic polio is particularly harsh because its debilitating effects can be lifelong.

Concerned about this situation and aware that it can be resolved, the Pan American Health Organization is seeking to eradicate wild poliovirus from the Americas by the end of 1990. PAHO's specific role in this collaborative effort with its member countries is to provide support and technical expertise, and also to serve as a center for information collection and disease surveillance.

Since this polio eradication campaign was first announced in 1985, nations of the Americas have been quick to endorse it and commit themselves to its objectives. Similarly, international

and interagency support for the eradication effort has been strong. (Rotary International, UNICEF, the U.S. Agency for International Development, and the Inter-American Development Bank are among those groups pledging financial and technical help.)

At present, the drive to halt polio is focused most strongly on the continental Latin American countries, where the disease still looms as an important public health problem. In North America, excluding Mexico, indigenous poliovirus has been eradicated since the early seventies; and no polio cases have been reported from any Caribbean area except the island of Hispaniola over the past five years.

However, it should be noted that the obstacles to eradication are relatively great in much of Latin America because the more tropical climates make it easier for the disease to spread throughout the year, and because health systems frequently are not fully developed. Nevertheless, even in the tropical regions of South America, the annual occurrence of polio has been cut nearly in half.

## **Surveillance and Vaccination**

Intensified disease surveillance and immunization activities are at the heart of the eradication strategy. Those countries that have not yet achieved control over the spread of polio are working to vaccinate all children born each year. Many have used a dual strategy of strengthening their regular, clinic-based immunization services while filling in gaps in coverage by staging national vaccination days. In fact, even if vaccination efforts immunize only four-fifths of all children, transmission of the virus can be so severely interrupted that the unvaccinated minority will be shielded from the disease.

Overall coverage in Latin America and the Caribbean has risen dramatically in recent years and is approaching the 80% mark. But, ironically, the children who are hardest to reach with immunization efforts are often precisely the ones most likely to become victims of polio, because they live in poor sanitary conditions that facilitate spread of the disease. In some rural areas, large geographic "pockets" still persist where immunization levels remain low.

Intensified disease surveillance goes hand in hand with immunization. Surveillance—emphasized by experts as crucial to the plan's success—includes all the epidemiologic "detective work" responsible for finding out where the remaining pockets of disease persist, for verifying that polio cases actually did occur, for indicating how many cases were involved, and for determining when and why each outbreak happened. In this way, surveillance provides the basis for health officials to decide upon preventive strategies—for example, whether to launch a new health education program through the mass media or to mount a district-level immunization campaign.

## Building Skills to Bolster Primary Health Care

National-level health officials and PAHO advisers predict that the US\$120 million price tag of the five-year eradication effort will buy much more than freedom from a devastating illness. They stress that the special skills health personnel will have developed and employed in eradication-related immunization and surveillance services will also be valuable tools for the management of more comprehensive primary health services. The focus on polio, then, serves as a means to accelerate overall vaccination efforts and to strengthen national health infrastructures. In this way, the polio eradication plan contributes on several levels to attaining the goal of "health for all by the year 2000."

The Americas led the world in wiping out another dreaded disease, smallpox, which was conquered by a ten-year PAHO/WHO global eradication campaign. The Americas were officially certified free of smallpox in 1973, fully six years before worldwide eradication was proclaimed. Given the rapid advances that have been made against polio over the last five years, experts believe that complete eradication is now within reach. In the view of PAHO's Director, Dr. Carlyle Guerra de Macedo, "The time has come for us to say that it is unacceptable for any child in the Americas to suffer from polio."

## NORTHEAST HOLDS KEY TO POLIO ERADICATION IN BRAZIL

Brazil's program to eliminate polio depends upon the increased immunization of children under age five living in the country's vast and hard-to-reach northeast, and upon countering a sense of complacency that followed early successes against the disease. According to PAHO data, between 70% and 80% of all cases in Brazil have been reported from nine of the ten states of the northeast, a region three million square kilometers in area.

Until 1979, Brazil had reported an annual average of about 2,500 polio cases. However, during the first year of a nationwide immunization drive in 1980, when 2.2 million immunizations were administered, the incidence of the disease dropped almost by half—to 1,290 cases. The decline continued until 1983, when only 45 cases were reported nationwide. Then, because of a belief prevalent throughout most of Brazil that polio was as good as gone, health officials say a sense of complacency set in. Health education and public information broadcasts became

perfunctory, reduced to promotional pieces for national vaccination days—consisting of announcements broadcast twice a year two weeks before the vaccination dates at 11 p.m., when most of the community slept. As a consequence, immunization levels declined and the number of cases rose—from 130 cases in 1984 to over 300 by mid-1986, with the majority reported from the northeast. In particular, outbreaks of considerable intensity were reported from Bahia, Ceará, and Alagoas states during 1986.

To meet the emergency, the Ministry of Health distributed 5.8 million doses of oral polio vaccine to the state health secretariats, “with the expectation,” according to a PAHO report, “that approximately five million children would be vaccinated.”

In addition to the vastness of the region and the sense of complacency, however, other problems arose—including a change in the dominant type of polio strain and low vaccine efficacy. While poliovirus type 1 was the dominant strain in 1985, type 3 accounted for some 70% of all cases reported in 1986. And although low vaccine efficacy was not the only factor involved, “intensive and extensive circulation of type 3 poliovirus in the northeast is associated with low vaccine efficacy,” a study following the outbreaks showed. Children under two years of age, representing 40% of the target group, were particularly affected.

Brazilian health officials refer to the immunization program as their “war” against polio. They wage it over coastland, prairie, and jungle, through a land 8.5 million square kilometers in area, where some four million children—all susceptible to polio—are born each year. The program centers on “intensive surveillance and containment vaccination,” says Dr. João Baptista Risi, Jr., Brazilian National Secretary for Basic Health Actions, during which health officials immunize everyone in the neighborhood of a home where a case of polio is detected, or even suspected, to prevent spread of the disease. The program also relies heavily on national polio vaccination days, on Saturdays in June and August, when some 450,000 Brazilians, mostly volunteers, are mobilized to administer immunizations at more than 90,000 health centers throughout the land. (To counter the northeast outbreak, an extra vaccination day was scheduled for April.)

While such consciousness-raising campaigns are important, health officials agree that immunization given routinely at all facilities, including curative facilities, is essential. There is also a need to regularly transmit informative and educational messages through the media. There are some 100 television stations and 1,200 radio stations in Brazil, as well as 3,000 vehicles equipped with loudspeakers, that are potential resources for the immunization program. In this connection, support is being sought from community leaders and national personalities—politicians, artists, athletes, and so forth. There is every chance of a sustained effort, health officials believe, now that Brazil’s President José Sarney has formally declared his government’s support for the drive to immunize every Brazilian child.

# NEONATAL TETANUS CONTROL EFFORTS

Neonatal tetanus is a deadly disease that threatens newborn babies in many developing countries. Unlike tetanus in children or adults, neonatal tetanus is nearly always fatal. Worse yet, it strikes long before the age at which children are normally vaccinated against tetanus.

The way a baby becomes infected with the tetanus-causing bacteria is through unclean birthing practices: Bacteria are introduced either through cutting of the umbilical cord with an unsterilized instrument or because the area is bandaged with unhygienic dressings. Once infected with tetanus, a newborn has little chance of surviving. The disease declares itself—typically between the fourth and tenth day after birth—when an apparently healthy baby stops nursing and becomes increasingly rigid. Typically, death follows within a few days.

## An Invisible Killer Revealed

PAHO experts estimate that neonatal tetanus kills nearly one million children each year in the developing world, with an unknown but substantial proportion of those victims coming from Latin America and the Caribbean. Despite this huge toll, however, the problem of neonatal tetanus remains largely hidden because many cases are statistically invisible. To begin with, most neonatal tetanus deaths occur at home and for cultural reasons may not be reported by the newborn's parents. Since the disease tends to strike hardest at poor socioeconomic groups, especially those in remote agricultural areas, parents may not have access to any health facility; or once it is brought to a health facility, the baby may be sent home because there is no treatment to give.

Beyond that, even if the death is locally reported, many regional surveillance systems are not equipped to compile neonatal tetanus statistics. Thus, all but the tiniest fraction of neonatal tetanus cases are completely excluded from national statistics. Only in the past few years have community surveys, conducted in a variety of countries, convincingly documented the fact that the problem is widespread.

Since the threat posed by neonatal tetanus was never recognized until quite recently, however, programs to prevent this "invisible killer" have not received much emphasis. PAHO is now urging ministries of health in all Latin American and Caribbean nations to give high priority to the investigation and control of neonatal tetanus.

## Defining the Problem

Control of any disease depends on understanding its behavior—including why, where, and when it will strike. Because no major studies have yet been conducted here, less is known about the distribution of neonatal tetanus in Latin America than in most other developing regions. The necessary detective work will include steps such as having local health workers begin to count and report the cases they see, and taking surveys to clarify the pattern of cases in various geographic areas. The insights yielded by investigation will enable health officials to focus their preventive efforts on the people and places where risk of the disease is highest.

## Keys to Prevention

Prevention of tetanus in the newborn centers around two complementary strategies that PAHO is calling upon the countries of the Americas to adopt.

The first strategy is immunization of all women of childbearing age—especially those who are pregnant—an action that protects their future babies from illness even if they come into contact with the infective bacteria. At present less than one in five women has been vaccinated. The vaccine against tetanus is called tetanus toxoid or TT. Two doses are needed, spaced at least one month apart. For expectant mothers, the doses can be started at any time during pregnancy, but sooner is better.

In coming years, national vaccination days aimed at young children will promote TT immunizations for their mothers as well. Officials of PAHO and national ministries of health have also recommended that health workers take advantage of any visit by women to a health facility as an opportunity for immunization. In fact, PAHO even suggests that governments consider making tetanus toxoid immunization a prerequisite for marriage registration.

The second strategy is to train traditional midwives in safe, clean delivery practices, so that they will use procedures that prevent newborns from being exposed to tetanus. Of course, better training and supervision for birth attendants will lead to overall improvements in maternity care; and improved maternity care, in turn, plays a vital role not only in averting tetanus deaths but also in preventing sickness and death of mothers and infants from other causes.

## Successes and Challenges

These dual preventive strategies can prove dramatically successful, as events in Haiti, Sri Lanka, and elsewhere have shown. In Sri Lanka, the rate of neonatal tetanus fell precipitously from 1974 to 1984, a drop directly associated with rising immunization coverage of pregnant women. In Haiti, newborn tetanus mortality dropped first when a national midwife training program started, and again when hospital clinics began immunizing women. After a hospital team offered immunizations to

women in local marketplaces, tetanus death rates declined even further, and when house-to-house services were instituted the rate fell to zero.

However, since relatively few people are aware of the neonatal tetanus problem, an integral part of the antitetanus campaign is informing the public. In this regard it should be noted that getting local communities involved in the education effort poses a special challenge, since the places where the disease is most likely to strike are generally hard-to-reach areas inhabited by groups who cannot read well.

Public health experts agree that neonatal tetanus should be banished from the Americas. It is also clear that with technical guidance and multinational coordination from organizations such as PAHO, the governments of Latin America and the Caribbean can drastically diminish the toll of this eminently preventable disease.

## Years of Life Lost to Cardiovascular Diseases in the United States

Cardiovascular diseases (International Classification of Diseases categories 390-398, 402, and 404-429) remain the leading cause of death in the United States despite a persistent decline in mortality of about 2% per year since 1968. Cardiovascular diseases rank third in years of potential life lost (YPLL) before age 65, a measure that generally highlights death in the early years. This ranking reflects the large number of people who die prematurely from ischemic heart disease (IHD) (ICD categories 410-414). Other categories of cardiovascular disease accounting for YPLL are acute rheumatic fever (ICD 390-392), chronic rheumatic heart disease (ICD 393-398), hypertensive disease (ICD 401-405), diseases of pulmonary circulation (ICD 415-417), and other forms of heart disease (ICD 420-429).

Total YPLL, as well as YPLL for men and for women, have continued to decline since 1968. In 1983, the most recent year for which complete age-, sex-, race-, and cause-specific mortality data are available, cardiovascular diseases accounted for 1,620,219 YPLL before age 65; this represents 16% of the YPLL for all causes of death in 1983. IHD accounted for 1,001,875 YPLL (62% of all cardiovascular disease YPLL). Thus, IHD alone would rank as the fourth highest cause of YPLL behind unintentional injuries, malignant neoplasms, and suicide.

NOTE: Changes in life-style factors have been related to the decline in total mortality from IHD. At present, prevention programs place considerable emphasis on smoking and hypertension. Two other risk factors—elevated cholesterol levels and low levels of physical activity—have received increasing attention in recent years and are emerging as important targets for further control efforts.

Source: U.S. Centers for Disease Control, *Morbidity and Mortality Weekly Report* 35(42), 1986.