communicable diseases
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Communicable diseases, in WHO's parlance, are those which are transmitted either from human to human, from animals to people, carried to us by insects or other "vectors," or conveyed to us in the air we breathe, the water we drink and the very ground we tread on.

A large number of them are so firmly entrenched in human communities that we tend to take them for granted— infections like the common cold, or influenza, or chickenpox. It is easy to forget that, for at least two millennia to our knowledge, smallpox too was "taken for granted" by generation upon generation; yet just 13 years of global effort sufficed to wipe it from our planet.

Many of these communicable diseases, in fact, are fostered by low standards of environmental sanitation, malnutrition, inadequate social and economic development, and general ignorance of simple changes in behaviour that could help to avoid infection. And some diseases contribute to levels of sickness, disability and death—particularly in children aged under five in the developing world—that are simply unacceptable in the closing decades of the 20th century.

Acute diarrhoeal diseases alone (including cholera) represent the primary cause of child mortality in developing countries and contribute to one-third of the 15 million deaths in this age group each year. Another one-third result from acute respiratory infections, primarily pneumonias. In addition, these infections are the leading cause of sickness in virtually all countries.

Parasitic diseases, in particular malaria, filariasis, schistosomiasis and trypanosomiasis, remain as serious public health problems on a global scale, and put the brake on attempts to develop many tropical areas. Efforts to control them may drain a sizeable proportion of the available resources in countries where these diseases are endemic. An estimated 17.5 million people are infected with onchocerciasis (river blindness) and about 340,000 are blind as a result; an additional one million individuals are considered to have suffered significant loss of sight, leaving them partially disabled.

Tuberculosis and leprosy still constitute significant public health problems, while viral haemorrhagic fevers continue to have a major impact, particularly during epidemic outbreaks, in many countries. Sexually transmitted diseases are on the increase throughout the world, with a general shift towards younger age groups. And even while the number of pathogens found to be sexually transmitted has been increasing in recent years, the disease spectrum in this area has been further complicated by the emergence of acquired immunodeficiency syndrome (AIDS) and its various disease manifestations.

A matter of persistent concern is the increasing resistance of microbes to drugs as well as resistance of insects and other vectors to chemical pesticides—trends that impede progress in disease reduction and increase the costs of control operations. Rapid expansion of the cities, the boom in travel and population movements, and increasing trade in human and animal foods within and between countries—all these have increased the risk of diseases being rapidly transmitted from one country or region to another.

The burden of many communicable diseases could undoubtedly be reduced by environmental management, by which we mean providing safe water supply and the sanitary disposal of refuse, wastewater and excreta, ensuring adequate housing, safeguarding the environment from chemical pollution and other control technologies. But building up these control measures is, of necessity, a slow process. In big cities, they require a large capital investment, while in the vast rural areas of the Third World, environmental management can only take place as part of the overall social and economic development.

So emphasis will continue to fall on traditional methods of preventing and controlling communicable diseases. These methods include setting up and maintaining surveillance systems to enumerate and
Communicable diseases

evaluate all cases that occur, a ma-

jor first step in determining the
distribution, responsible factors,
severity and extent of each com-
municable disease. This in turn
provides the necessary base-line
information for setting the right
priorities for applying disease con-
trol strategies.

Other control efforts include
building up manpower resources
through training programmes in
technical and managerial areas,
increasing the number of skilled
personnel engaged in communicable
disease control activities, and de-
veloping simple diagnostic tech-
niques and inexpensive means of
treatment that primary health care
workers can deliver even in remote
villages. And today there is re-
newed interest in “health promo-
tion” aimed at showing people how
to avoid disease, to actively seek
health and maintain healthy lifesty-
es, all of which will directly con-
tribute to the prevention or early
treatment of many communicable
diseases.

Research is another important
component of disease prevention
and control activities, and thanks to
modern biotechnology the hunt is
on for new and inexpensive drugs,
diagnostics and vaccines. It is par-
ticularly important to develop new
drugs to counter the many disease-
causing organisms which are be-
coming increasingly resistant to
existing antibiotics.

Vaccines, by contrast, have
proved in recent history to be one of
the most cost-effective methods of
protecting human health. The in-
tensive immunization programme
mounted by WHO was the key to the
global eradication of smallpox by
1977. Inspired by this success, who
initiated, in 1974, the Expanded
Programme on Immunization, a
programme designed to immunize
the children of the world against six
common childhood diseases. Al-
though no reliable figures on immu-
nization coverage were available at
that time, it could be estimated
from the total quantities of vaccines
being used, that fewer than five
percent of children in their first
year of life were receiving the vital
third dose protecting them from polio, as well as diphtheria, whoop-
ing cough and tetanus (DPT). As a
result, some five million children
died each year from vaccine-pre-
ventable diseases; another five mil-
lion more were crippled, blinded or
mentally damaged.

Today, immunization coverage
in the developing countries (exclud-
ing China) had increased to 50 percent
in 1987 for a third dose of DPT or
polio vaccine. The stage is now set
to add newly available vaccines to
existing immunization schedules,
and to further strengthen national
managerial capabilities to ensure
immunization and other kinds
of health care for mothers and
children.

WHO continues to promote and
support several programmes aimed
at developing vaccines, whether to
control more effectively those dis-
eases for which vaccines do not ex-
ist, or to improve the efficiency of
existing vaccines. Theoretically at
least, it should now be possible to
design vaccines which provide long-
term protection without any of the
side effects observed in the past.
Despite encouraging results, new
vaccines for general use are not go-
ing to be available overnight.

So who is not slackening its ef-
forts to prevent and control com-
municable diseases by existing and
conventional means. But a research
and development effort of this mag-
nitude, and the introduction of
improved disease prevention and
control strategies, cannot be under-
taken without encouraging coun-
tries to build up still further their
national capabilities in such fields
as epidemiology, biological re-
search and health systems research.
In turn the essential elements of
these new strategies have to be in-
corporated rapidly into the curri-
cula of training institutions, and
health staff will need continuing
education and complementary train-
ing facilities. It goes without saying
that who will continue to do its ut-
most to collaborate with Member
States and strengthen their capacity
and efficiency in all these fields.
I

n ancient times, it was observed that those who survived an infectious disease seldom suffered a second, similar sickness; and this was particularly apparent in the case of a disease like smallpox which left characteristic pockmarks on the skin. Sometimes a mild infection could be related to the site of the disease symptoms, and this led to the practice of deliberate infection with the disease agent at these sites—a hazardous procedure.

The first demonstrably safe procedure for preventing infection—the process now called vaccination—was carried out in 1796 by Edward Jenner. He inoculated a boy with infectious material from cows (cowpox virus) and then showed that he was immune from smallpox by injecting him with material from a victim’s smallpox scab! Louis Pasteur later developed (initially by chance) the means of changing the properties of microbes so that their potential for causing disease (a property called virulence) was much reduced without greatly affecting their ability to induce an immune response. This process of attenuation was subsequently used to develop some of our most successful vaccines, particularly to control diseases caused by viruses.

Viruses and many bacteria cause disease by damaging or killing the cells they infect; consequently, a vaccine aims to prevent infection of these cells by the virus or bacterium. Many vaccines consist of the live, attenuated organism; or, if such a preparation is either not available, or cannot be made, the virus or bacteria is inactivated (killed) before being administered.

Other bacteria secrete powerful poisons which damage the host’s cells, so protection against these bacteria called for a different strategy. The isolated poison was made the basis of the vaccine but it had to be inactivated in a special way before it could be safely administered. The six vaccines against the common childhood diseases which form the basis for WHO’s Expanded Programme on Immunization are prepared by one or other of these three procedures: the measles and polio vaccines are attenuated strains of these viruses, and an inactivated preparation of polio virus is also available; BCG against tuberculosis is an attenuated form of the tubercle bacillus; the pertussis vaccine is an inactivated preparation of the bacteria that cause whooping cough; the diphtheria and tetanus vaccines are composed of the inactivated poisons (toxins converted to toxoids) secreted by those bacteria.

Measles, rubella (“German measles”), yellow fever and polio vaccines can give life-long protection from these diseases. Though vaccine administration may cause some side-effects, a comparison of the incidence of complications following infection with the wild-type measles virus versus the vaccine dramatically demonstrates the advantage of vaccination. In the United States, immunization of children with measles vaccine prior to school entry is now required by law, with the result that indigenous measles has virtually disappeared from that country. Though widely used, BCG has given variable results. It has proved to be an effective vaccine for infants but has given variable results in adults. A trial of this vaccine in South India showed such poor protection against tuberculosis that, because of the continuing global importance of this disease, it was clear that we needed more detailed knowledge of the biology of the bacterium and of the immune responses that would give immunity from infection. This led to the establishment, in 1984, of the WHO Vaccine Development Programme which supports research on a number of viral and bacterial diseases for which new or improved vaccines are needed.

These vaccines have reduced the burden of infectious disease to a much greater extent in developed than in developing countries, partly because of wider coverage of the population in the former but also because the other infections are much more prevalent in the latter countries. The WHO Programme on Tropical Diseases Research (TDR) was established to support research aimed at controlling one bacterial (leprosy) and five parasitic diseases prevalent in these countries. At present, a vaccine to control leprosy and several preparations aimed...
at different stages of the life-cycle of the malaria parasite are under trial. Similarly, WHO’s Diarrhoeal Diseases Control Programme (CDD) aims to develop means of controlling diseases of the gastrointestinal tract, while new vaccines to control rotaviral infections, which cause serious diarrhoea in infants, and cholera are being tested.

The need for these and other vaccines is great. A third of the world’s population is at risk of malaria infection and millions suffer from simultaneous infection by several parasites. The appearance of AIDS due to infection by the human immunodeficiency virus, HIV, is already of major concern in developed countries but seems certain to have devastating consequences in some developing countries. What can the new knowledge of immunological processes and the new techniques of the molecular biologists contribute to making effective vaccines to control these diseases?

Broadly speaking, there are two main new approaches towards vaccine development. The first attempts a synthetic approach by making in the test tube those parts of the virus or bacteria or parasite which are thought to be the most important for stimulating the immune response. The synthetic preparation, composed of peptides, should provide an entirely safe vaccine, by contrast with existing vaccines which may cause side-effects, sometimes serious, in a very small proportion of recipients. However, the as-yet-unresolved question is: will such vaccines be as effective in preventing disease as the conventional approach? If used by themselves, the answer is No! They must be combined with other molecules and administered with an adjuvant (a preparation which enhances the immune response to the peptide).

The second approach is to use techniques which involve isolating the DNA coding for antigens, transforming cells with the DNA so that the antigen is now produced by these cells and can be used as a vaccine. A variation of this approach is to incorporate this DNA into an existing vaccine, such as the smallpox vaccine, so that this well-tried vaccine can be used to protect against another disease, such as malaria. The smallpox vaccine did however cause side-effects, with occasional deaths. Fortunately, novel ways of making such a “hybrid vaccine” both more safe and more effective than the parent vaccine have recently been described, but such preparations have yet to be licensed for human use.

There have also been advances in developing oral vaccines. A “genetically-disabled” form of a Salmonella organism, which can be taken orally, has been successfully used to protect against typhoid fever in trials in Egypt. DNA coding for an important antigen of the organism causing cholera has been incorporated into this Salmonella, and trials are in progress to establish whether this hybrid vaccine will now also give protection against cholera. If so, it can readily be appreciated that such hybrid vaccines offer the possibility of developing multivalent vaccines. In other words,
some day a single vaccine may protect against several diseases—a precious boon in tropical countries where there is so much infectious disease.

Scientists working in these areas are justifiably confident that applying these new approaches should lead to the development of vaccines against many diseases, particularly such parasitic diseases as malaria. But the future is not entirely rosy. Infectious micro-organisms have co-evolved with man over millennia, and the “cleverest” micro-organisms have developed means of by-passing man’s defences so that they continue to survive and to plague us. One example is the influenza virus. By continually changing its properties, this virus escapes pre-existing antibodies and infects susceptible cells. This is why the currently available vaccines are only partially successful. The virus can be controlled at a later stage, but not before it has caused the symptoms of influenza and has spread to other people. It is the “perfect” virus; most people easily survive an attack and the virus continues to flourish!

In the process of adapting to human hosts, HIV is still a major killer and, unfortunately, it seems to have nearly all the cards on its side. As well as the trick of changing its properties, like the influenza virus, it infects and destroys those cells which are an essential part of the immune system. For these reasons, it is difficult to develop a vaccine which would protect those at risk from infection by this virus. Our hopes for controlling AIDS rest on educating people about transmission of the virus, and on the not unrealistic hope that an effective drug to control the infection will speedily be developed.

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Dr Barry Bloom, in his Presidential Address to the American Association of Immunologists in 1986, presented a graphic summary of the situation in tropical and other developing countries. “This is the Third World, in which 75 per cent of the planet’s population lives, where 96 per cent of all children are born and 99 per cent of all infant and child deaths occur, and where 10 kids die of vaccine-preventable illness every minute.”
Influenza is preventable

by Yuri Ghendon

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Influenza—'flu—is for most people an unpleasant illness that sends them to bed for a few days and leaves them feeling weak. But it is also a potential killer.

In the United States alone for example, in 1957, the Asian strain of influenza virus caused an estimated 70,000 deaths; the Hong Kong strain that appeared in 1968 caused about 30,000 deaths in the same country. Even in years not associated with antigenic shift in the virus, many people die as a result of influenza infection. In fact, 10,000 or more excess deaths have been documented in the USA during each of 18 different epidemics from 1957 to 1985.

Some 80 to 90 per cent of the excess deaths attributed to pneumonia and influenza during epidemics have occurred among persons of 65 years of age or more, although 'flu-associated deaths among children or previously healthy adults under 65 years of age are reported during major epidemics. This excess mortality is not only a direct result of pneumonia, but also of cardio-pulmonary or the chronic diseases that are exacerbated during influenza infection. In addition, the days lost from school and work, and the hospital care required for complications, result in a very high cost of influenza to society.

Three types of human influenza viruses, A, B and C, were discovered in 1933, 1940 and 1947 respectively. Only type A is associated with pandemics.
Manufacturing influenza vaccines in Switzerland. But doubts still linger about their efficacy.

Photo Swiss Serum and Vaccine Institute ©

Below: For most people, 'flu means a bout of sneezing and a few days in bed. But it is a potential killer.

Photo WHO/D. Henrioud

These viruses are variable and can change the antigenic specificity of their envelope proteins—haemagglutinin and neuraminidase. They thus escape the neutralising antibodies that we have developed through previous infections or vaccinations and that ought to protect us. That is why the strains of viruses used for the production of influenza vaccines have to be changed every one or two years.

WHO’s influenza programme essentially consists of rapidly isolating and characterising all new strains in order to make available for production laboratories those that show substantial variation from the current strains. WHO Collaborating Centres for influenza in London and in Atlanta, USA, together with 110 national institutions for influenza in 79 countries all carry out surveillance activities. Each year, towards the end of February, WHO holds a consultation to draw up recommendations for the composition of influenza vaccines for the forthcoming season. It is now possible to recombine the new antigenic variant with a strain that has been trained to grow rapidly in chick embryos, or with the cold-adapted attenuated master strain, and this reduces the time needed to get into large-scale vaccine production.

Two sorts of vaccines are now available: those that are inactivated, concentrated and purified for administration by injection and live, attenuated, cold-adapted vaccines destined for instillation or pulverisation into the upper respiratory passages.

Even though this disease is a widespread problem in many countries, the existing 'flu vaccines are among the least used vaccines available. The need for annual revaccination, misconceptions about the capabilities of the vaccines—many recipients expect them to prevent all respiratory infections—and questions about their efficacy have led many physicians to conclude that vaccination against influenza is not worth the effort.

In fact there is plenty of evidence to show that influenza vaccines can protect individuals and indeed, if used properly, may protect 70 to 80 per cent of vaccinees in the community as a whole.

Vaccination strategies have two main objectives: to protect individuals who are at particular risk from disease (the elderly, the chronically sick, people living in institutions under crowded conditions and so on); and to protect other defined sectors of the population (such as schoolchildren, or factory workers). In the last case, vaccination may have direct benefit for the individuals involved and for the community as a whole. But it should be noted that in closed or semi-closed settings, maximum benefit from immunization is likely to be achieved when more than about 75 per cent of the population are vaccinated, so as to exploit the advantages of "herd immunity."

Besides vaccines, there are good antiviral preparations against the disease. Amantadine and rimantadine have proved in many controlled trials to be effective against influenza A infections, both prophylactically and therapeutically (administered between 24 and 48 hours after the onset of symptoms). In prophylactic use, a 70 to 90 per cent reduction in infection has been achieved. It is unfortunate that these drugs have been so little used to protect against influenza A infections.

On the other hand, chemoprophylaxis with these drugs is not a substitute for vaccination, because there is no protection against the B virus, and also because patients may fail to take the drug for the full 6 to 12 weeks of an epidemic period. Aerosolised ribavirin has been recommended against influenza B, but its usefulness would possibly be restricted to patients confined in hospital.

Influenza is not a trivial disease. It kills many thousands of patients every year and the cost of its deprivations to any country's economy is enormous. But influenza is preventable. By means of the vaccines and antivirals now available it is possible to protect individuals both in the high-risk groups and in defined sectors of the population.

WORLD HEALTH, July 1988
Recent progress in developing hepatitis B vaccines has brought much closer the ultimate goal of controlling and eliminating this disease—much as that other viral disease, smallpox, was eradicated.

Hepatitis B today remains one of the most important global infectious diseases; every year, around 40 million people die from the consequences of chronic hepatitis. About six million people develop hepatocellular carcinoma, a disease which is also associated with hepatitis B virus (HBV). Between 200 and 300 million people carry HBV chronically, and they constitute the major reservoir of this infectious agent.

Hepatitis B is highly endemic in South-East Asia and in Central and Southern Africa. Some 70 to 80 percent of people living in these regions have had contact with the virus, of whom five to ten percent in certain areas even 20 percent or more are chronic virus carriers. In industrialised countries, such as the United States and the western and northern parts of Europe, the hepatitis B prevalence is rather low, not exceeding five or ten percent, with a chronic carrier rate well below one percent. In these countries, it is a disease of particular risk groups, such as medical personnel, patients needing frequent blood products (for instance, haemophiliacs and chronic haemodialysis patients), persons with close contacts to HBV carriers, drug abusers who share contaminated needles, male homosexuals and prostitutes. The prevalence of HBV infection ranges from about 20 percent in medical personnel to more than 90 percent in haemophiliacs who have received frequent treatments with non-inactivated clotting factors prepared from unscreened human blood.

The acute disease caused by HBV does not differ from hepatitis due to other viral agents, such as hepatitis A virus or the hepatitis non-A, non-B viruses. In a typical case, the disease starts after an incubation period of two to six months. For several days, there are only vague symptoms similar to those of other viral infections. They include fever, anorexia, weakness and headache; a more specific symptom is right upper quadrant pain with local tenderness. This so-called “prodromal” phase is followed typically by jaundice (yellowing of the skin and mucous membranes) lasting for about two to four weeks. This typical course of acute hepatitis B has several variations. In about one percent of cases, acute fulminant hepatitis develops with an often lethal outcome; in contrast, many infections cause a mild illness without jaundice (“anicteric hepatitis”) or may even occur with no symptoms at all.

Two characteristics make infection with HBV so important: the development of chronicity (persistence over a long period of time), and the association of HBV with a type of cancer called hepatocellular carcinoma. Most patients recover from acute hepatitis, but five to ten percent continue to carry the virus in their livers for a long time, even for a lifetime. And even patients without any signs of acute hepatitis may develop chronic infections. These chronic HBV carriers may remain asymptomatic or they may develop chronic hepatitis, of which there are two forms: chronic persistent hepatitis, which may eventually resolve itself; and chronic active hepatitis, which usually proceeds to cirrhosis, chronic liver failure and death.

Irrespective of the clinical condition, all chronic carriers are a potential source of infection to others,
and all are at a considerable risk of developing hepatocellular carcinoma. This malignancy is one of the most common tumours in such areas of high hepatitis B endemicity as South-East Asia and Central Africa. Although at a molecular level the relationship between HBV and the development of hepatocellular carcinoma is still unexplained, epidemiological data have shown that this tumour is indeed associated with chronic hepatitis B infection.

The hepatitis B virus (HBV) is a spherical particle measuring 42 nanometers (42 thousand-millionth of a meter) in diameter. A protein envelope called hepatitis B surface antigen (HBs antigen or HBsAg) surrounds the virus core, which contains deoxyribonucleic acid (DNA) as carrier of the viral genetic information. HBV has a very narrow host range; only man and the great apes are susceptible to this virus. But in recent years similar viruses have been detected, infecting woodchucks, ground squirrels and peking ducks; and all these viruses together with HBV are classified as “hepadna” (for hepatitis-DNA) viruses.

Hepatitis B virus is present in the blood of chronic carriers, and can also be present but in considerably lower concentrations in other body fluids such as saliva, tears or semen. Faeces and urine, as long as they are not contaminated by blood, can be assumed not to contain HBV. Transmission is only possible when infectious virus enters the bloodstream. This may take place by direct percutaneous inoculation, through skin cuts or scratches, or through mucous membranes which sometimes have small breaks allowing the virus to enter. Intact skin, however, cannot be penetrated by HBV.

Before the screening for HBs antigen was introduced, transfusion of HEV-contaminated blood was a common mode of transmission. This is still a frequent means of transmitting the disease in areas where donor screening is not customary. In medical surroundings, one of the most important ways of transmission is through inadvertent injury, for example, by a contaminated needle, scalpel or similar instrument, but it may also be passed from patient to patient by inadequately cleaned and sterilised instruments used in dentistry, cardiac catheterisation and endoscopic procedures.

Transmission is also common in paramedical situations where poor hygiene is prevalent, such as the use of insufficiently or non-sterilised instruments for acupuncture, tattooing or ear and nose piercing. In the household setting, too, there are possibilities for percutaneous inoculation and transmission of HBV; there is a considerable risk of contracting hepatitis by sharing razors, toothbrushes, nail brushes, nail files or scissors or similar instruments of personal hygiene with acutely infected persons or chronic virus carriers; contaminated work surfaces which may come in contact with injured mucous membranes or skin are also a danger. This danger is increased by the persistence of infectivity of dried serum for at least a week.

The most important routes by far, however, are the infection of new-born babies by infectious mothers, transmission by close personal contact (especially between mother and child and between children), and transmission by sexual contact. Infections during the neonatal period or during early infancy are particularly frequent in regions where HBV endemicity is high. Infected new-born babies almost invariably become chronic carriers, and infections in young infants fre-
Hepatitis B: eradicable?

Frequently progress to chronicity; this explains the high rate of chronic carriers in certain countries.

We have no specific therapy, so prevention of hepatitis B by hygienic measures, passive immunization and active vaccination is vitally important. In the medical field, hygienic measures include wearing gloves while taking blood, carefully cleaning and sterilising instruments, and using disposable syringes, needles and other instruments whenever possible. Similar measures must be adopted in para-medical situations, for instance, the strict use of sterile instruments for ear piercing or tattooing.

Passive immunization with hepatitis B immunoglobulin (HBIG) is a specific means of preventing the disease. HBIG is an immunoglobulin preparation which contains antibodies in high concentrations against HBsAg, the envelope component of HBV; these antibodies neutralise the virus: that is they inhibit its infectivity. The main disadvantages of this method are the limited period of protection (only about three months) and its very high cost; so such passive immunizations against hepatitis B are only used, for example, after an injury with a contaminated needle or for the new-born children of HBV-carrier mothers. Today, in both of these instances, passive immunization should be combined with active vaccination.

Active vaccination avoids the disadvantages of HBIG; it produces a long-lasting immunity and is cheaper.

Drug abusers who share needles are at particular risk of contracting hepatitis B. Photo WHO/P. Laurie

The first hepatitis B vaccine, prepared from the plasma of chronic HBV carriers, is highly immunogenic, very effective and safe. Its use is indicated in areas where there is a low prevalence of hepatitis B in high-risk groups such as health care personnel, haemodialysis patients, intravenous drug abusers, male homosexuals and babies newly born to HBV-positive mothers. In high prevalence areas, this vaccine should be given to all children or at least to all children of carrier mothers. But it is expensive because both the starting material, human plasma, and the extensive purification procedures are costly. Whereas industrialised countries can afford to vaccinate the relatively few members of high-risk groups, it is impossible for other countries to immunize large numbers of people.

A new vaccine produced by recombinant gene technology was the first step towards reducing these costs. First licensed in 1986 in the United States and the Federal Republic of Germany, it is made from HBsAg-producing recombinant yeast cells. At present, it is only slightly cheaper than the plasma vaccine, but the production costs can undoubtedly be reduced in the future.

Other techniques such as the use of synthetic peptides—small parts of the surface protein of HBsAg—are currently being investigated in the hope of producing alternative vaccines. And transfer of technology to countries of the Third World, without lowering the standards set by WHO for hepatitis B vaccines, will enable those countries to produce their own vaccines from locally obtained plasma, thus reducing the costs considerably.

WHO's Expanded Programme on Immunization (EPI) has included the elimination of hepatitis B among its goals, and even though it will be long before we can vaccinate everyone at risk, plans for mass vaccination programmes are not utopian. We could begin to put these plans into practice in the near future. And as the costs of vaccines drop further, it will become possible to vaccinate all people at risk, so preventing disease and death among millions of people and leading—ultimately—to the eradication of hepatitis B.
Leprosy: light at the end of the tunnel

by John Maurice

Mr John Maurice, a Scottish freelance science writer living in the Geneva area, formerly worked as Communications Officer for the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR)

In busy Manaus, capital of Brazil's Amazonas State, anyone in a hurry at 3 o'clock in the afternoon should not take bus number 63. The chances are it will stop for no obvious reason at a street corner while the driver, Amauri de Olivera, disappears into a soft-drink bar. He will return five minutes later, a grin on his face. His regular passengers grin back. They know that he has just taken his monthly dose of a new treatment. They know that thanks to this treatment he will not lose his fingers, toes or eyebrows. That he will not go blind. That his hands will not twist into rigid claws. That purulent ulcers will not appear on his feet preventing him from walking. That he will not contaminate his family or his passengers. They know that in a few months he can stop taking the pills because he will be cured of a disease that up to now has been considered incurable. Bus driver de Olivera is one of over two million leprosy patients throughout the world who have been or are receiving multidrug therapy (MDT).

MDT is WHO’s answer to a threat that could have spelled catastrophe for the 1.600 million people, including the estimated ten to twelve million leprosy patients, who live in the 53 countries where leprosy is endemic: the threat that dapsone, virtually the world's only anti-leprosy drug for the past 40 years, would become ineffective. By the early 1980s, studies set up by the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR) were disclosing resistant strains of Mycobacterium leprae in up to one-third of cases in several endemic countries. In some areas, large numbers of patients were failing to respond to dapsone, a drug that has to be taken for years to be effective. Action had to be taken urgently.

In 1981, WHO hastily convened a Study Group, which came up with a treatment scheme based on a combination of three drugs: rifampicin, a powerful bactericidal compound; clofazimine, a weak bactericidal drug but with potentially useful anti-inflammatory effects; and dapsone itself. Patients with mild paucibacillary leprosy (= with few bacilli) would be given dapsone and rifampicin for six to nine months. Those with more severe (multibacillary) leprosy would receive dapsone, rifampicin and clofazimine for 24 to 48 months. Rifampicin and clofazimine would be given under strict supervision. Dapsone would continue to be self-administered.

The Study Group's recommendations were based on:
- laboratory evidence that leprosy bacilli resistant to one drug would succumb most probably to a second and almost certainly to a third drug;
- preliminary results from early clinical trials suggesting that within a few weeks of starting this treatment, over 99 per cent

Soon, the disfiguring signs of leprosy, such as those affecting this young girl in Malawi, will be less common, thanks to multidrug therapy.

Photo WHO/J. Maurice
of the ten thousand million or so leprosy bacilli infecting a patient would be killed and that the patient would thus be non-infective to others;
- the assumption that effective treatment limited to six months at best, 24 months at worst, would stand a much better chance of being accepted and taken regularly than treatment of limited efficacy prescribed for years.

MDT has been adopted by 45 of the 53 leprosy-endemic countries or territories of the world (that is, with a prevalence equal to or greater than 1 per 1000 inhabitants), and altogether by 96 of the 152 countries or territories of the world reporting any cases of leprosy to WHO. Of the over five million registered leprosy patients in the world, some 2.1 million have been put on MDT. Of these, over a quarter have completed their treatment. They continue to be examined at regular intervals, however, in case of relapse or any untoward reaction as a result of the leprosy bacilli that have been killed by the treatment but not yet cleared from the body.

Statistics give only one side of the picture. Interviews with a cross-section of patients—over 200 in all—in five countries where MDT is being enthusiastically applied (Venezuela and Brazil in Latin America, Ethiopia and Malawi in Africa, and India) give an equally bright picture.

A 60-year-old rancher, for example, interviewed at his farm in Venezuela's Portuguesa region cries from relief when he is told that his 25-year search for a cure is about to end, thanks to a definitive, two-year course of MDT. His wife, who has just been found to have a white patch on her back—an early sign of the disease—does not cry when she learns she has leprosy, since she is told that MDT will rid her of infection within a few months.

In the East Godavari district of southern India's Andhra Pradesh state, a young woman proudly shows off her vigorous 18-month child. She calls him her "MDT child" because during her pregnancy she refused, against medical advice, to give up her therapy. "I couldn't stop," she explains. "It was making me a live person again."

A farmer in Ethiopia's Shewa region mounts his mule before dawn to reach an MDT treatment point held on market days under a warka tree—a four-hour journey across boulder-strewn tracks that disappear every few miles beneath rushing streams. "You'd have to take my mule from me or chop off my legs before you'd stop me coming for my treatment," he declares.

Generally, patients say they "feel better" on MDT. But their enthusiasm may also stem from the greater attention MDT brings them. They now have a regular monthly date with a health care worker and, of course, with other fellow leprosy patients—under a banyan tree in the Indian countryside, in a mobile health-care houseboat in the Amazon, between rows of perch drying in the sun on the shores of Lake Malawi.

"For many patients, MDT is like an opening in the sky, a light at the end of a long dark tunnel," says a leprosy control officer in Maracay, Venezuela. "We can begin to use the word 'cure' when we talk to patients."

The enthusiasm of health workers for MDT is often tempered by the increased initial workload it requires—more paperwork to ensure careful recording of drug administration and clinical changes, and more travelling to reach the treat-
ment points that are located as close to patients' homes as possible. But the workload diminishes quickly as the treatment programme gets under way. Examples: Over the past three to four years the number of cases has dropped from 30,000 to 4,000 in Srikakulam District, India; from 1,900 to 300 in Kambata region, Ethiopia; from 9,000 to 2,500 in Malawi.

So dramatic is the drop in some areas that leprosy control staff hired and trained to deal with hundreds or thousands of patients face imminent unemployment or conversion to other health work. Some of the reduction in case-load may be due to the "weeding out" of inactive or dead patients in pre-MDT screening surveys. On the other hand, the drop is occurring despite the still fairly constant intake of new cases in many countries. (The very existence of MDT can bring an influx of previously "hidden" patients wishing to take advantage of the new treatment.)

Two key questions remain: Is MDT medically effective? And if so, for how long?

MDT was something of a gamble, admits Dr Shaik K. Noordeen, who heads the Leprosy Unit at WHO's headquarters in Geneva. "We were finding resistance to dapsone wherever we looked for it. We had to do something. There was simply no time for careful, long-term study."

So far, clinically and epidemiologically, MDT is living up to expectations, although it is too early to talk of victory. Many leprosy control officers say MDT seems to reduce the bacterial load in patients more quickly than dapsone alone. It may also reduce the frequency of the dreaded leprosy "reactions," with their concomitant pain, swelling and risk of permanent nerve damage and deformity. It also seems to be effective in preventing or delaying the onset of resistant bacilli – the relapse rate in MDT-treated patients seems to be well under one per cent in most areas. A further benefit of MDT is that it does not require hospitalisation but keeps patients in their communities, and thus helps to erode the social stigma which was fostered by forced isolation of patients in hospitals or leprosaria.

MDT is not without its critics, though. Sceptics fear that it will take more than 6 or 24 months of drug treatment to get the better of a disease that has an incubation time of up to 15 years. It is true that many paucibacillary patients still have leprosy patches after their six-month MDT course, but these lesions nearly always disappear over the next year or two. Other critics say too much emphasis is being put on drug therapy and too little on care for the estimated one to two million patients who are disfigured or disabled, and who require physiotherapy, surgery or special footwear. In Ethiopia and India, for example, facilities are clearly lacking to care for such patients, and in Malawi prevention of disability through early MDT treatment has deliberately been given priority over care of the disabled.

Whatever its merits and shortcomings, MDT must be credited with mobilising national and international resources to bring into the light of day a disease that for centuries has remained out of sight and often out of mind. It is forcing on communities the realisation that the walls of the leprosy ghetto can be pulled down, and that leprosy – like any other disease – can be diagnosed, treated and, perhaps one day, prevented.
Sexually transmitted disease (STD) and unwanted pregnancy are major health problems for sexually active young people aged between 15 and 24, who has had an STD prevention programme since its inception in 1948. To the list of STDs has now been added infection with Human Immunodeficiency Virus (HIV) which may lead to Acquired Immunodeficiency Syndrome (AIDS). The major strategy we have to limit the extent of the HIV epidemic is health education directed towards behavioural change. And even before AIDS began to be a major public health problem, the increasing rates of viral STD such as genital herpes or genital papilloma (warts) underscored the importance of preventing infection through health education.

Young people in virtually every culture are sexually active. The median age at first intercourse is 14 to 15 years in Africa, and 16 to 20 years in Europe and North America. Frequency and complications of STD are highest in sexually active young people. Access to reliable, modern contraceptive methods also is a major problem for them in most regions of the world. Except in parts of Western Europe, sex education programmes and the availability of contraceptives to young people have been slow to develop.

The causes range from ideological beliefs that sexuality should not begin prior to stable, long-term, monogamous relationships, to lack of adequate funding for education programmes.

The need to educate all people about STD is urgent, given that treatment is available for many and early treatment is often necessary to prevent blindness and infertility. It is even more urgent because of the STDs that are not treatable. This is particularly true for young people, who are just beginning to explore their sexuality and have not yet been permanently harmed. Information may be their only defence.

In planning a health education programme for young people, the timing of the communication, both as regards the life stage of the young person as well as the particular hour, day, and date, is important. Different information sources have particular strengths and weaknesses; content and timing have to be modified appropriately.

The mass media are effective in putting the message across to large populations, including that hard-to-reach group of adolescent school dropouts whose often destructive behaviours may put them at particularly high risk of unwanted pregnancy, and of STD. But these presentations must be carefully planned. Messages must be fairly simple and direct. Complex and frightening messages risk being only partially understood, and people withdraw rather than listen to them. Repetitious material tends to bore readers or listeners. Ideally the information should be presented clearly, simply, and specifically, but with sufficient variability between presentations so that the audience remains interested. For young people it is most effective if they can identify with the speaker.
and a dialogue format enhances their sense of involvement. Clear recommendations of health-preserving behaviour tend to elicit the greatest degree of acceptance and action. Credibility can be further increased by involving well-known and respected hero figures—including rock music stars.

France has found that media campaigns which are most effective in reaching those at high risk of STD present their information through comics strips, posters and advertising cartoons. In the Netherlands, popular guides called “Looklet” on sexuality are available to all young people, and reassuringly discuss specific self-protective behaviours, stressing mutual responsibility and respect for one’s partner. The Swiss have created several brochures on AIDS, from plain leaflets to cartoons or illustrated magazines. The United States has set up a “hotline” telephone service to provide information on STD and AIDS. Several developing countries have their own information programmes, making use of radio announcements and television spots. UNICEF has sponsored the production of a short animated film to teach street children—many of whom are forced into prostitution by economic need—how to avoid AIDS.

The mass media can provide an initial introduction to the subject to the greatest possible audience. The next most successful method to continue rapid learning is the small discussion group composed of young people themselves and a group leader. Such groups offer an opportunity to share views in an informed, concerned and responsible setting; they also encourage and endorse self-esteem. The role of the group leader is to facilitate discussion, and to provide clear, correct information as subjects arise.

Comprehensive programmes for STD and family life education have a high success rate. The low rates of adolescent pregnancy and prevalence of STD in Sweden and the Netherlands attest to the value of such long-term programmes. Even less comprehensive programmes do succeed in teaching important information to adolescents, although it may be hard to determine whether behaviour is also changed. Courses most likely to succeed in

In virtually every culture today, young people are sexually active. All too few have access to counselling, information and education about the risks and how to avoid them.

Preventing the problems of sexually transmitted disease and unwanted pregnancy is an important goal, and several creative health education efforts are under way to meet this need. WHO itself has recently convened a group of experts to discuss what national and international initiatives can help to prevent STD and AIDS in young people, and how to improve those programmes.
It is now evident that AIDS has different epidemiological patterns in every society and that societies react to AIDS differently, according to their social context. So it is important to study both the behaviours of the disease as well as that of the society in order to better contend with the problem.

In the case of Mexico, we now know from retrospective studies that the first cases of AIDS in this country occurred in 1981. At the beginning of the epidemic, practically all cases had a history of sexual contacts in the United States, and most of them were affluent homosexuals. Nowadays the cases are not so clearly stratified, as they have spread progressively to lower social and economic groups, both in the cities and in the countryside. The number of cases has increased exponentially, numbering over 1,000 by the end of 1987. In fact the total has doubled every eight months so far, which allows us to estimate that there will have been up to 25,000 cases by 1991.

Mexico has the distinct peculiarity of sharing 2,000 miles of border with the United States. And after Mexico City and Guadalajara, the two largest metropolitan areas in the country, the highest rates of AIDS are found in those states which border our giant neighbour.

As happens everywhere, the age groups most affected are young adults, by virtue of being sexually active. In Mexico, AIDS has affected men predominantly, with a sex ratio of 20 males for each female with the disease. Close to 90 per cent of the cases have occurred in homosexual or bisexual men. The rest are recipients of blood products (7 per cent), and heterosexual people (3 per cent). Very few cases have been associated with intravenous drug abuse, since this form of drug addiction is almost non-existent in our country—a fact explained more by the high costs associated with this habit than by moral constraints.

Among the regional variants of the AIDS pandemic, one aspect peculiar to Mexico concerns both the nature of the problem and the public health response to it: this is the existence of professional blood donors. Until recently, one-third of the blood supply in Mexico came from people who made a living—however precarious—by selling their blood. It was not until May 1986, when a law making HIV screening mandatory in all blood units was passed, that we started noticing a high sero-prevalence among professional blood donors. This social phenomenon is not, as yet, fully understood, and is the subject of current research. Not all donors everywhere were infected; there was a marked clustering in a few metropolitan areas, with a mean sero-prevalence of about seven percent. Compared with altruistic donors, who had a sero-prevalence of HIV infection of 0.1 per cent, the professional donors therefore constituted a high risk group.

Given the magnitude of the problem with the blood supply, the authorities decided not to wait for an explanation of this phenomenon, but simply to curtail it. Our Congress banned all commerce with blood in the country, in April 1987. This measure, along with the screening of all blood units, has made our blood supply safe. It has also made us face two predictable consequences: opposition from those who made juicy profits by commercialising blood and blood products, and a transitory short supply of blood.

The blood bank owners did not in fact present a major problem, because of the overwhelming support that the public showed for the new
The supply of blood has now been secured through altruistic donation campaigns and by encouraging donation from relatives of those in need. In addition, guidelines for the proper prescription of blood transfusions have been distributed to doctors and hospitals.

This story illustrates the value of epidemiological surveillance in detecting an emerging problem, but also the extensive public health benefits that can stem from a simple (though politically complicated) legal action.

In the absence of vaccines or drugs, we have to rely on two measures to prevent the spread of AIDS: education and sanitary control. The former is aimed at changing the behaviour of individuals, while the latter protects society as a whole.

I believe it is the responsibility of governments worldwide to ensure a safe blood supply. Some simple measures only require political will to be implemented. Self-exclusion of blood donation from members of high-risk groups is both effective and advisable. Inactivation of the virus in blood products is easy and also very effective. Banning commerce with blood—where it occurs—is highly recommendable. The last and most effective measure to ensure safety in blood is to screen all blood units for HIV antibodies. Although this is expensive for the budgets of most developing countries, prevention will always be less onerous than the costs of keeping people in hospital.

Educational campaigns for AIDS should be designed and oriented towards specific audiences: the general population, medical care providers, and people with high-risk behaviour. The scope and contents of the education materials should vary accordingly. In Mexico, given the inherent delicacy of the topic and the prevailing moral values, we decided to take a “step by step” approach in mass media messages for the general population. The first step was to combat the myths about the disease, and to inform people how it can be transmitted. Thereafter, we recommended ways to prevent acquiring AIDS, including the use of condoms. This has been a landmark in mass media communication, since even partial nudity is prohibited on television screens, and the word “condom” is still shocking to many. Doctors have received guidelines for the medical care of AIDS patients and recommendations on how to prevent transmission. Finally, members of high-risk groups have received explicit material about “safe sex” and a supply of condoms.

Mexico’s National AIDS Committee (CONASIDA) is formed by representatives of public and private institutions in the health sector and by experts in the field and operates within the Ministry of Health to advise health institutions throughout the country. Its mandates are many, including the epidemiological surveillance of the epidemic; supervision and evaluation of all related activities; research on epidemiological, laboratory, social and educational issues; guidelines and recommendations for preventing transmission; and administration of budget and fundraising. It is still too soon to evaluate the benefits of CONASIDA’s actions, but my own view is that they are very positive.

In less developed nations AIDS is competing for resources with other diseases, at a time when resources are most meager in the health sector. In Mexico, we are convinced that it is better to allocate resources to preventive actions—at a time when the problem is still one that can be curbed.
Yellow fever gains ground

by Thomas P. Monath

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In September 1986, doctors at Yaho Lutheran Hospital in the northern part of Cross River State, Nigeria, recognized an unusual occurrence of illness, jaundice and death among villagers in the area. Within a month, health workers were making similar observations in adjacent areas of Benue State. Schools closed down because of deaths among pupils, and schoolrooms were converted into treatment centres to deal with the expanding epidemic.

Serological examinations indicated that yellow fever virus was responsible for the outbreak. An immunization campaign started but encountered many difficulties in delivering the vaccine. An international team of virologists, epidemiologists, and entomologists sponsored by WHO reached the affected area in mid-December, while the epidemic was still in progress. When it subsided in late December, at least 9,800 persons had fallen ill and 5,600 had died.

Many people are surprised to learn that yellow fever remains an important public health problem in the 1980s. Despite advances in environmental health, and the discovery of vaccines which rendered yellow fever entirely preventable during the first half of this century, the disease continues to appear in epidemic form and threatens to invade countries from which it has long been absent. Both 1986 and 1987 witnessed a major resurgence of yellow fever in West Africa, and a reappearance of the disease in cities for the first time in over 40 years. What are the reasons for the continuing spread of this deadly disease? And what can be done to control it?

Yellow fever virus is transmitted by the bite of an infected mosquito. Roughly one person among every five who are infected with the virus becomes severely ill, and of these about 20 per cent succumb to the disease. In its most severe form, the disease begins with fever, headache, and muscle pains, and progresses within several days to a toxic stage, with the appearance of signs of damage to vital organs, in particular the liver, kidneys, and heart. Patients develop jaundice, kidney failure, bleeding from the stomach and elsewhere, and finally circulatory collapse and coma. At the present time there is no specific drug or treatment, although good supportive care in hospital may prevent complications and decrease mortality. Unfortunately, those affected by the disease most often live in remote areas served by extremely limited medical resources.

Yellow fever was the first infection of humans shown to be due to a virus and the first virus shown to be transmitted by a biting insect, the mosquito Aedes aegypti. From the 18th to the early 20th century, it was one of the great plagues of humankind. From endemic areas of Africa and South America, the disease was introduced by ships into port cities of the Caribbean, Central and North America, and Europe, creating much havoc and social disruption.

In 1900 Major Walter Reed and his colleagues working in Havana obtained proof that the mosquito transmitted the yellow fever virus. This finding led to sanitation campaigns against the urban, domestic mosquito, first in Cuba and Panama, and subsequently in other countries in the Americas. These efforts were successful and led to a marked reduction in the frequency of Aedes aegypti-borne epidemics. The last major outbreak in the Americas involving this mosquito vector occurred in Brazil in 1942.

Until the 1930s, it was generally accepted that yellow fever was an exclusively human infection, transmitted only by Aedes aegypti, which breeds in containers holding water in and around houses. The discovery of a jungle cycle of transmission in South America and Africa, involving passage of the virus between
monkeys and tree-hole breeding mosquitos, shattered hopes that the disease could be eradicated. Cities and towns infested by Aedes aegypti would be continuously at peril of re-introduction of yellow fever virus from the jungle cycle. To eliminate this threat and to reduce the cost of perpetual aegypti control programmes, Dr Fred L. Soper developed the concept of eradication of this species. Under the aegis of the Pan American Health Organization (PAHO), eradication programmes undertaken in the Americas between 1940 and 1965 met with some successes. Alas, these successes have now largely been reversed.

Development of the 17D vaccine in 1937 by Dr Max Theiler and Dr Hugh H. Smith of the Rockefeller Foundation was a landmark in the control of yellow fever. Produced in chicken eggs, the 17D vaccine has a remarkable record of safety and efficacy and is now produced in 12 institutes around the world. WHO plays an important role in the international regulation of yellow fever vaccination, granting approval of laboratories for manufacture and testing of the vaccine. It may be given to infants as young as nine months (even at six months in situations of high risk), and produces solid immunity lasting at least ten years—the limit recognised for the purposes of international travel—and probably for life.

In the Americas, only 50 to 300 cases of yellow fever are officially reported to WHO annually. The true incidence is probably 10 to 20 times greater. Countries reporting the largest number of cases are Bolivia, Brazil, Colombia and Peru. All cases result from exposure to forest mosquitos which have acquired the virus from infected monkeys. So the risk is greatest in young adult males engaged in clearing forests for agriculture, road construction and harvesting timber. Several countries have long-established, systematic programmes of routine immunization, aimed mainly at residents of endemic jungle areas.

A disquieting problem in recent years has been the reappearance of Aedes aegypti in Brazil, Bolivia, Colombia, Ecuador and Panama, infesting areas from which it had previously been eradicated. The pace of re-infestation of South America is accelerating inexorably, and epidemics of another aegypti-borne virus—dengue fever—have affected hundreds of thousands of people. These events underscore the increasing risk that yellow fever will again cause urban epidemics in South America, and that the virus will spread to receptive areas of the Caribbean basin, Central and North America.

In Africa, the epidemiology of yellow fever stands in stark contrast to that in the Americas. In most countries, surveillance of the disease is rudimentary or non-existent, and sporadic, individual cases such as occur in South America go unrecognised. Instead, explosive epidemics appear at irregular intervals, often involving thousands of deaths. Even during epidemics the disease is greatly under-reported, and official notifications, which have numbered only about 3,000 cases between 1965 and 1985, reflect less than one per cent of the true incidence. Important outbreaks have arisen in Ghana (1977-1979), Gambia (1978), Burkina Faso (1983), Nigeria (1986-1987), and Mali (1987). Investigations suggested at least 30,000 cases and 10,000 deaths during these episodes.

The ecology of yellow fever in Africa is considerably more complex than in the Americas. In addition to a jungle transmission cycle (involving tree-hole breeding mosquitos and monkeys) and an "urban" transmission cycle (involving domestic Aedes aegypti and humans), there exists in Africa a "savanna" transmission cycle involving tree-hole breeding mosquito species and both monkeys and humans. Most yellow fever epidemics have been of the latter type, occurring in relatively remote areas.

In Africa, the term "urban" transmission cycle is a misnomer, since Aedes aegypti is common in both cities and villages—wherever
people store water in pots and other containers in and around the home. In contrast to the Americas, where this domestic mosquito has not been responsible for yellow fever epidemics for decades, Africa has been repeatedly plagued by Aedes aegypti-borne outbreaks.

The most recent and most frightening example of “urbanisation” of yellow fever occurred last year in Nigeria. The 1986 epidemic in Cross River and Benue States occurred in a relatively remote area; but there was considerable movement of people in and out of the region. Concern that the virus might thereby spread to densely populated areas, where Aedes aegypti was prevalent, was justified by the appearance in March 1987 of a large epidemic in Oyo State, western Nigeria, some 500 kilometers away from the original focus. Morbidity in the cities of Ogbomosho and Oyo was high; cases appeared in Ibadan and other localities, and the virus spread subsequently to parts of northern Nigeria.

Aedes aegypti populations were exceedingly high, largely due to the breakdown of piped water supplies in the affected towns, with the result that residents were compelled to store water in and around the home. With more than seven million people at risk in the epidemic areas, the authorities were faced with the need for a mass immunization campaign that stretched available resources to the limit.

**Prevention and control**

Two approaches exist to prevent and control yellow fever: immunization of the population at risk; and elimination or reduction of the mosquitoes responsible for transmitting the virus.

The 17D vaccine, which provides effective, long-lasting immunity, has been available for 50 years. Yet most countries in Africa have never used the vaccine as a preventive measure (or have discontinued its use), and rely upon emergency mass immunization in response to epidemic spread of the disease. This is invariably initiated too late to effectively combat epidemics.

The main obstacle to preventive use of yellow fever vaccine in Africa has been the high cost of large-scale immunization, requiring supplies of the vaccine, methods to maintain the live vaccine at low temperatures in the field, and both mobile teams and fixed vaccination centres staffed by trained personnel. As a long-range strategy, adding yellow fever vaccine to the routine schedule of childhood vaccines as part of WHO’s Expanded Programme on Immunization (EPI) may overcome the problems associated with mass immunization.

Another aspect of concern to health planners is the limited production capability and supply of the 17D vaccine. The methods for vaccine manufacture in eggs, developed in the 1930s, are cumbersome, and some manufacturing institutes have outdated facilities and equipment. The increasing threat of Aedes aegypti-borne epidemics in the Americas; the potential for similar events in Africa as human populations expand and concentrate in cities; and the possibility of yellow fever virus reaching into Asia all demand a high level of preparedness for emergency production of vaccine. Promoted by WHO, efforts are now under way to develop and
evaluate a new 17D vaccine produced in cell cultures rather than in eggs, and to increase the stocks of seed virus required for rapid manufacture.

In the face of an on-going epidemic, the most effective means of interrupting virus transmission would be to use insecticide sprays to kill the adult, infected mosquitoes. Unfortunately, this approach is not as easy as it sounds and is of unproven efficacy under the conditions faced in most yellow fever epidemics.

In the Americas, control or eradication of *Aedes aegypti* has been successfully used to prevent urban yellow fever. Yet most programmes have suffered setbacks or reversals in the past two decades. To add insult to injury, an exotic mosquito species, *Aedes albopictus* has recently invaded the Americas from Asia, and threatens to fill a niche similar to those mosquitoes involved in the savanna transmission cycle in Africa, with an enhanced risk of epidemic spread.

Among the factors responsible for the breakdown of the *Aedes aegypti* eradication programme in the Americas are the growth of cities and poor sanitary conditions which encourage breeding sites. The increasing rapidity and scale of commerce and travel allows greater movement of mosquitoes and infected persons between countries. The rising cost of vector control, as well as the competition for manpower and funds with other public health and environmental priorities, have led to a diminished commitment to the programmes.

As the situation worsens, the pendulum is swinging back toward recognition of the need for effective control and eradication of *Aedes aegypti*. The next decade will determine whether our fears of expanded *aegypti*-borne epidemics are just, and may witness a rebirth of vector control and immunization programmes in the Americas and in Africa.
Sleeping sickness—re-awakes

by Pierre Cattand

Mr Pierre Cattand is Training Officer with the Trypanosomiases and Leishmaniases unit at WHO headquarters in Geneva

With 50 million people at risk, 36 endemic countries and some 20,000 reported infections every year, sleeping sickness remains an important public health problem for Africa. The extent of the problem can be better appreciated with the knowledge that, if untreated, infected individuals will die of this disease, more correctly known as human African trypanosomiasis.

Precise numbers of its victims cannot be evaluated. The most conservative estimate would be considerably higher than the number of actually reported cases, which is based on very limited surveillance and on infrequent and localised surveys.

The African continent has paid a heavy price in the past. On the northern shores of Lake Victoria, in the Congo basin, particularly along the Ubangui, the largest tributary of the River Congo, and in the territories lying within the big arc of the River Niger, thousands of people died of the disease early in this century. One of many reports states: "...From the 1st to the 15th February 1918, we surveyed nine villages in the Koumi valley (Central African Republic) and examined 1,243 villagers out of a population of 1,260 and found 722 infected individuals; during that same period we personally witnessed 35 deaths due to the disease." In a 1920 report of the Ubangui-Shari medical sector, we can read: "... In this population of 100,000, we examined all the inhabitants one by one. We found 5,347 sleeping sickness cases, 170 lepers, 159 cases of various mycoses, 13 cases of elephantiasis, ... Sleeping sickness on its own is the cause of one-third of the total mortality in that region." Similar situations have been described in East and West Africa.

Today, the increase in the number of patients observed in the same historically endemic areas, the discovery of new cases in places previously free of sleeping sickness, and the large number of suspects found during spot-surveys all suggest an important recrudescence of the disease. This is particularly the case in Southern Sudan, Uganda and Chad and, to a lesser extent, in Cameroon, Congo, Côte d'Ivoire and Zaïre.

If we ignore past evidence of the disastrous impact of sleeping sickness and fail to take immediate action, it may soon become an unbearable burden for a great number of African countries. The flare-ups that have recently occurred or are occurring in many parts of the continent demonstrate what can happen when surveillance activities and coverage are reduced. Control and preventive measures must be put into effect now before village communities feel the devastating effects of sleeping sickness and once again are forced by the tsetse fly to abandon their fertile lands.

In 1916 in Brazzaville, Dr Eugène Jamot elaborated his preventive
guidelines for sleeping sickness which are still valid today. Based on the fact that man is the reservoir for the protozoa *Trypanosoma gambiense* that cause the disease and the tsetse fly is the vector that transmits it, Jamot defined a two-fold objective to control the disease, namely the simultaneous destruction of the parasite and the vector. He knew that the disease concentrates in local areas and that imported cases from these old foci are the origin of new ones. Consequently, as many patients as possible had to be treated in the existing foci and all possible neighbouring areas where the disease could propagate itself had to be kept under surveillance. In order to ensure early diagnosis and eliminate the human reservoir, preventive services have to reach all the people; they cannot wait for the people to come to them.

On the basis of these principles, control and preventive services have worked successfully in the past to contain sleeping sickness. Results obtained by the Trypanosomiasis Control Mission in Angola illustrate this success. The annual surveillance of 500,000 to one million persons at risk over a period of 25 years, between 1949 and 1973, has resulted in the number of new cases diagnosed each year dropping from 4,318 to just four.

Because of the epidemiological differences between the West and Central African *T. gambiense* and the East African *T. rhodesiense* forms of the disease, control of the latter requires a greater emphasis on dealing with the tsetse fly than on active surveillance of the human population. In *T. rhodesiense* infections, the signs and symptoms are so acute and the evolution of the disease so rapid that patients will seek medical help; well-organized passive detection can therefore be an efficient tool for controlling the disease. This is not the case with *gambiense* sleeping sickness, a chronic disease whose early signs and symptoms are so mild that they may even go unnoticed. This asymptomatic period may last for months, and sometimes years.

The consequences of reducing surveillance for the *gambiense* form can be very serious. In one endemic country, the number of surveyed persons was reduced in 1961 from almost one million to 300,000; as a direct result, the number of new cases rose successively in the following three years to 9, 66 and 117. Surveillance was then enlarged to cover 800,000 people and was maintained at that level. Six years later, only four cases were diagnosed, three of which had, undoubtedly, been infected outside the country. I could cite many other similar examples.

These alarming demonstrations of the potential danger of leaving endemic foci unattended have created an increased awareness at national and international level, and have activated research towards finding better technical solutions to prevent and control sleeping sickness.

The last decade has witnessed the development of several new methods for diagnosing the disease. Field-adapted serological (blood serum) assays are now available, while refined parasitology techniques enable health workers to confirm a greater number of suspects. Parameters defining the stage of the disease can now be determined with greater accuracy, using modern laboratory technology and equipment that are well-adapted to field use. A promising new compound known as DFMO is under experiment for patients who do not respond to the classical trypanocidal drugs.

Vector control techniques have also improved considerably. Bush clearing has been replaced by efficient, simple and inexpensive tsetse trapping methods which are environmentally safe.

We can certainly expect further progress. The specific and sensitive serological tests available today will undoubtedly be made more simple to use. Parasitology techniques will become more efficient and cheaper. Cerebrospinal fluid analysis will be made easier to perform and drugs will become safer and simpler to handle. However, these anticipated improvements should not provide an excuse to delay or postpone indefinitely vital prevention and control activities.

This is why, in 1984, WHO launched a programme entitled: “Primary health care approach towards the control and prevention of sleeping sickness,” aimed at promoting national programmes and providing endemic countries with the information and the expertise required to design, set up and maintain such activities. The major objective is to participate with the health authorities of endemic countries in designing and formulating country programmes. The programme arranges training courses in the new laboratory diagnostic techniques and in vector control methods, makes available technical documentation, and provides a supply line for equipment, material, reagents and drugs that are often complicated to obtain. Finally it offers countries the assistance they may need to mobilise bilateral or multilateral support.
From surviving smallpox to preventing measles

by Edna Adan Ismail

Mrs Edna Adan Ismail is a Technical Officer in the unit of Maternal and Child Health at WHO's Regional Office for the Eastern Mediterranean in Alexandria

"Why do children die of measles when a vaccine exists and the disease is preventable?" The person asking this question was no ordinary man. It was Ali Maow Maalin, the Somali hospital cook who, 11 years ago, became the world's last case of endemic smallpox.

The spots that blossomed on his face in October 1977 resulted in photographs that have been reproduced around the world. He was "the exception that proved the rule"; smallpox had finally been backed into a corner, in this case the small Somali port of Merka; the chain of transmission had been well and truly broken, and a disease that had scourged mankind for millennia no longer existed on the planet Earth.

Ali was lucky in that he survived, but he was ill enough to spend some time in a quarantine camp. Today, aged 34, he says: "I was so weak that I was sure I was going to die, and wanted to be near my family."

Gradually, he regained sufficient strength to resume working his family's land in the Lower Shebeli region. He knew he had had a near miss from a serious disease and that smallpox was now eradicated. But he was unaware that vaccines also existed to prevent other diseases.

"During the last ten years, our village and community have lost many, many children. Usually each family loses half of the children born to the women—and often the mothers die as well," he explains. "Women and children are so weak that I thought perhaps the world was still searching for a vaccine that was strong enough to protect them against all the diseases that frequently afflict them and which kill them so easily."

Tragedy struck once more this year when the little sister of Ali Maalin Maow died from complications following measles. Just before she died, the child was taken to the nearest primary health care unit for help. At that stage, nothing could be done to save her, but her family was told that she could have been protected through immunization against measles as well as against whooping cough, diphtheria, polio, tetanus and tuberculosis.

The day after they buried the girl, Ali walked to the District Medical Office and volunteered to be trained how to administer immunizations. He needed no training in promoting the idea of immunization since he was far more motivated than some of his trainers. He was the living witness, and a survivor, of one of the oldest and most virulent "plagues"—one which had been eradicated through single-minded and international efforts and actions. For the past few months, Ali has actively lived up to his pledge to devote his life to the eradication of measles.

When he is asked "Why only measles?", his angry answer is: "Because it killed my sister! Because it occurs so frequently! Because it spreads in the same way as smallpox and has a rash! And finally, if I succeed in convincing parents to protect their children against measles, then I can explain and also give the other immunizations that are available. First of all, I need the people's trust. I don't want them to lose a sister or a daughter before they discover too late that the child need not have died!"

This trust, Ali certainly enjoys. Being from the village and speaking the same dialect as the people he serves, the world's last smallpox case is now a dedicated primary health care worker whom any community would be lucky to have.

Mahadsanid (Thank you), Ali Maalin Maow.
Cooperation with industry

by John F. Dunne

Dr John F. Dunne heads WHO's Pharmaceuticals programme

Just 100 years have elapsed since the roots of the modern research-based pharmaceutical industry were first established along the Rhine Valley in Central Europe. Inspired chemists then sensed that newly-developed techniques for producing virtually unlimited numbers of aromatic compounds from coal-tar derivatives held important implications for medicine as well as for the manufacturing industries. Even they, however, could never have foreseen where their visionary commitment would lead. It is providential that outstanding early achievements in drug development, such as the demonstration of pain-killing activity in aspirin and phenacetin, assured the long-term survival of a commercially-sustained research activity.

Some 40 years were to elapse before the discovery of the sulfonamides heralded the subsequent explosion of innovative pharmaceutical chemistry that has transformed the basis of therapeutic practice within the professional life-span of a single generation of clinicians. Fifty years further on the pace of innovation shows no sign of slackening. Indeed, the rapid development of DNA recombinant technology has provided the basis for a second pharmaceutical revolution, by creating a biological mechanism for synthesising a virtually unlimited range of complex naturally-occurring enzymes and vaccines with unprecedented ease.

This prodigious innovative capacity should assure the industry of an exemplary commercial image. Paradoxically, however, companies have too often found themselves to be targets for vociferous allegations regarding promotional excesses and abuses of trust, not least in some developing countries. The relationship between the pharmaceutical industry and who should be one of productive partnership in health care delivery, but all too often the dialogue has been diverted to issues of ethical precept such as advertising norms and the rational use of drugs. The industry's responsibility to health care may never be totally reconciled with its commercial obligations. Nonetheless, both health objectives and the image of the industry will suffer unless individual companies find a basis for effective rapprochement with the governments which constitute their major trading partners, and unless they act spontaneously to exercise activities that are perceived to exploit rather than to support the communities they are entrusted to serve.

The advent of AIDS has delivered a dramatic demonstration that man exists tenuously in an unstable environment; that infectious disease remains a potential hazard everywhere—and not only in those underprivileged countries where it has never ceased to inflict an inadmissible burden on society. In fact, viral diseases remain singularly resistant to treatment, and the conquest of the bacterial diseases remains dependent upon an unrelenting battle against drug-induced resistance.

Over the years, this phenomenon has successively compromised the value of the sulfonamides, many of the broad-spectrum antibiotics including the aminoglycosides, and successive generations of penicillins and cephalosporins. It has created a challenge that has recently resulted in the development of quinolone derivatives, antimicrobial agents with a fundamentally different bactericidal mechanism. These are of particular significance since they may ultimately provide a more secure means of stemming the rising tide of hospital-acquired infections that are at present unresponsive to most conventional antibiotics.

This same phenomenon of resistance is responsible for frustrating earlier hopes of eradicating malaria and for the sharply rising attack rates in many of the countries where the disease is highly endemic. Not only is the most virulent of the malaria parasites commonly becoming resistant to previously effective drugs, but the mosquito vectors have become resistant to available insecticides. Innovative pharmaceutical research alone holds the potential for stemming the ravages of the disease. The recent discovery of not one but three promising antimalarial substances has at least provided a basis for temporarily alleviating the situation while research goes on towards the
Cooperation with industry

longer-term goal of developing an effective vaccine.

This is not an isolated instance of successful and continuing research into the therapy of transmissible tropical disease. Who itself has collaborated directly with pharmaceutical companies over the past decade in the initial screening and development of many other compounds with antiparasitic activity. In less than a decade, drugs have emerged from these activities that are safe and effective enough to be employed in mass chemotherapy of schistosomiasis, intestinal ascariasis, and, most recently, onchocerciasis (river blindness). Other compounds with promising activity against filarial worms and trypanosomes maintain the momentum of these programmes. No less urgent, and of prime importance in the face of predictions that populations of some of the least developed countries are set to increase fourfold by the middle of the next century, are analogous collaborative attempts to develop contraceptive methods that are culturally as well as technically acceptable to the communities in greatest need.

The ultimate challenge for both partners in this research is to assure that the end products ultimately become widely available where they are most needed. More is at issue, however, than an assurance of adequate deliveries of the products. Workable systems of drug registration and procurement need to be instituted within the target countries to provide an effective framework for their subsequent distribution and control; supply channels have to be upgraded to assure the quality of the products up to the time of their delivery; objective prescribing information needs to be issued to ensure they are employed effectively; and new cadres of health workers may need to be trained in how to use them.

Several companies have already made valuable contributions to these objectives but the task remains daunting and cannot, in many instances, be separated from the need to strengthen the whole infrastructure of health delivery. The hope is that the existence of more effective drugs will attract the multilateral and bilateral support on which success is ultimately dependent.

Talloires: a quiet revolution

by Robert Walgate

Dr Robert Walgate is the Editor of the London-based Panos Features Service

A "quiet revolution" in world health care was announced a few weeks ago at a meeting of health leaders in a lakeside priory under the snow-capped foothills of the French Alps. The revolution, which will combine high technology with basic primary health care, was inspired by the successes of the Expanded Programme on Immunization (EPI) which was started in the 1970s in a bid to immunize all children against six killer diseases of childhood—tuberculosis, measles, whooping cough, diphtheria, tuberculosis and polio.

A special "Task Force for Child Survival" links WHO with the UN Children's Fund (UNICEF), the UN Development Programme (UNDP), the World Bank and the Rockefeller Foundation. In four years of work it has raised money, engaged governments at the highest levels, and provided and delivered cheap and effective vaccines to 50 per cent of the children using existing health structures. It is therefore halfway towards the eventual target of reaching 80 per cent of the world's children by 1990.

Vaccines are now saving a million children's lives each year, and are protecting another quarter of a million children from crippling polio. That's a result that gave a boost to the 60 delegates attending the meeting in Talloires, beside Lake Annecy in France—delegates who included health ministers from each continent, international agency leaders and donors.

Mr James Grant, Executive Director of UNICEF said that in 1984—when untold numbers of children were dying from vaccine-preventable diseases—the prospects for achieving universal immunization seemed very uncertain. By late 1985, when the target was reviewed at a meeting in Cartagena, Colombia, "it was like Spring: there were a lot of green shoots coming up, so it looked as if the idea might work."

Reviewing the progress towards Universal Childhood Immunization (UCI), Mr Grant said: "We've seen the figures. Immunization rose from just 10 per cent in 1980 and less than 20 per cent in 1984 to 50 per cent in the autumn of 1987—with an expectation of reaching a worldwide average of over 80 per cent by 1990."

As a result of this global success, Talloires saw a number of barriers broken, new agreements forged. On the one hand, the technologists learned from the UCI work that health was not just a matter of injections, but was a social process of education, inspiration and "empowerment" of the primary health care movement. They learned that, however magical a treatment, it is useless unless a willing, effective health system can deliver it year in year out to, say, an African woman giving birth in her hut or a boy in a Calcutta slum. On the other hand, those who had been highly suspicious of "Western" technologies and their champions had learned that life-saving vaccines, at least, had now been delivered to half the world's children.

Dr Halfdan Mahler, Director-General of the World Health Organization, has always believed that UCI (a UNICEF term) should not be just a target to satisfy "institutional vanity" but a campaign to provide lasting benefit. UCI should lead, Dr Mahler always insisted, to two further goals: continuing immunization for successive generations of children, and lasting improvements in local health systems.

But he summed up the mood of the Talloiers meeting exactly when he said that development consisted of "knowledge—and motivation," that the immunization campaign was delivering both, and that the result was not the weakening that had
once been feared but an "empowerment" of the primary health care movement.

But "revolution"? Is that not going too far? It was Dr V. Ramalingaswami, past Director-General of the Indian Council of Medical Research and now special advisor to UNICEF, who called it a "quiet revolution." And the President of the World Bank, Mr Barber Conable spoke of "a grand alliance for health in which the World Bank would be proud to serve, in whatever capacity."

The new philosophy that emerged at Talloires is "can do and will do," the conviction that technology can be applied sustainably to medicine in the developing world and in such a way as to strengthen primary health care. Certainly, those who work to deliver vaccines and other primary health care into remote villages and into the anonymous, sprawling slums of cities will continue to face enormous problems. Health workers often lack electricity to refrigerate vaccines, and must deal with very low literacy levels, poor training and ignorance which ensure that the very poor will still remain the hardest to reach.

There are great tasks ahead, and much variation in present achievements. For example, according to WHO's March 1988 statistics, only 16 per cent of pregnant women receive immunization with tetanus toxoid—the treatment needed to halt the present 800,000 annual deaths from neonatal tetanus. Measles vaccine has reached 91 per cent of children in Botswana—but only 16 per cent in India, where fully one-eighth of the world's un-immunized children now live. Through a massive campaign, India has approached the global average of immunization of 50 per cent of its children (including tetanus toxoid but excluding measles). But there have been press reports in India of misuse of vaccines by little-trained health workers. And while in some areas there is now public demand for more vaccination, in others there has been "consumer resistance." As a result, the federal government in New Delhi is setting up an expert group to study the question of public acceptance.

Highly organized China, on the other hand, appears to be on target for UCI even earlier than 1990, according to Minister of Health Dr Chen Mingzhan. He faces difficulties, principally in management and training—and in reaching populations in the remote mountains where, as he said, it can take a health worker a day to move from one family to another.

In Latin America, average immunization against polio has reached an all-time high of 80 per cent. But in Ecuador the necessary three shots of the polio vaccine have reached only 50 per cent of the nation's children—and even fewer in the slums of the coastal city of Guayaquil. In Latin America the city slums must be the "top, top priority," says Dr Ciro de Quadros of the Pan American Health Organization.

In the Arab-speaking world, child mortality has tended to remain embarrassingly high despite increasing wealth. But Egypt is a bright spot. According to Mr Grant of UNICEF: "Egypt has achieved a massive breakthrough in immunization and oral rehydration to save babies from dehydration during diarrhoea. This year 80,000 to 100,000 children will be saved because of these interventions."

Mr James Grant, Secretary-General of UNICEF, speaking at the Talloires' meeting earlier this year. In the audience—WHO's Director-General, Dr Halfdan Mahler.

Photo WHO/IT, Farkas

Funding is an important issue in Africa. Private donors such as Rotary International have made enormous contributions, amounting to hundreds of millions of dollars. But in Uganda, Dr Ruhukana-Rugunda, until recently Minister of Health, is worried about how the UCI campaign could be continued beyond 1990—if UCI staff and the funds that back it were then withdrawn or reduced. So far the Ugandan Minister has raised immunization levels against the six diseases of the UCI campaign from 5 per cent three years ago to 50 per cent today, with a target of 75 per cent by 1990.

But this has been using the relatively cheap, widely available vaccines on which the UCI programme is based. The promised vaccines against the really big killers, malaria and diarrhoea, and other major tropical diseases will certainly cost much more to develop.

Although there is no definite prospect that outside donor support will be reduced, and indeed in the medium term it may even be increased ("There is life beyond 1990!" it was said at Talloires), the Ugandans' fears do reveal the other side of "sustainability": the question of who will pay the US $2,000 million annually ($600 million of it in hard currency) that full, sustained global immunization is projected to cost in the 1990's. Though development nations already pay globally some 80 per cent of the estimated costs of the UCI campaign, these are mostly for salaries in local "soft" currencies. Hard currencies (for vaccines, for example) are another matter.

These are some of the problems that must now be faced by the new, pragmatic health consensus that emerged at Talloires. But there was no sense of despair at the meeting—rather the thrill of excitement and action. "I'm just flabbergasted at the extent of the optimism, on the part of everybody, the ministers of health, the donors—everybody feels they're doing something..." said one participant at Talloires.

Indeed, looking forward beyond the UCI target of 1990, delegates felt able to discuss rational, sustainable plans for the year 2000 which included:

- the global eradication of polio, which is still crippling 250,000 children a year in the Third World;
- the saving of 95 per cent of the nearly two million children who now die of measles each year;
- the near-elimination of tetanus in newborn babies, which kills up to 100,000 babies a year;
- a 70 per cent reduction in death due to acute diarrhoea in under-fives, which now occurs at a rate of 5 million per year;
- a 25 per cent reduction in acute infections of the lung, which now kills 3 million children each year;
- reducing infant and maternal mortality rates in all countries by at least half.

As Dr Ken Warren, Vice-President of the Rockefeller Foundation (one of the Task Force members) said afterwards; "Talloires went way beyond the immunization efforts. It's brought about a total sea-change in how to deal with problems in the developing world. Now people are re-adjusting and trying to find their own place in it. That's what you saw happen here."
who Medals for Promoting Tobacco-Free Societies

Some forty individuals and institutions outside the field of health were named recipients of commemorative certificates and medals, inscribed "Tobacco or Health: Choose Health," issued by WHO to mark the World's 1st No Tobacco Day on 7 April, which was also its fortieth anniversary.

Recipients were honoured for "achievement worthy of international recognition in promoting the concept of tobacco-free societies." They were regional organizations, and institutions and national organizations, and on the list are also the International Tobacco Control Club, the International Control Club, the International Anti-smoking Club, and the International Tobacco Control Club.

The awards were made to actors, athletes, cartoonists, former presidents, legislators, a philanthropist and taxi drivers, but the majority went to journalists - appropriately enough as the day originated from a resolution by WHO's World Health Assembly with a strong media content, asking print and electronic media to "voluntarily refuse advertisements for a day.

As a result, some 1,000 letters of appeal were sent by Dr Halpert, WHO's Director-General, asking publishers of newspapers and news magazines and owners of radio and television stations to stop acting for the "public good."

The Medalists

Presentation of the commemorative medals were made in Geneva; New York; Washington, D.C.; Alexandria, Egypt; Adelaida, Australia; and Tokyo. The following were the medalists honored in Geneva, with excerpts from their citations:

- Reader's Digest, for carrying in February 1984 - long before the link to ill-health had been established - an article that asked "Does Tobacco Injure the Human Body?" and publishing some hundred articles over the decades that warned of the dangers of cigarettes and, recently, of smokeless tobacco.
- Mario Cortesi, film maker and editor of the Swiss daily Bieri-Bienna, for producing independently Der Dauft der grossen weiten Welt ("The Air of the Great Wide World"), a film that portrays the reality behind the industry-created romantic myth of smoking.
- Aeroflot, for introducing the smoke-free 4-hour flight in 1978, and for being the first to make all international flights smoke-free, from January 1982.
- Maurice de Bevere, "Morris," Belgian cartoonist and creator of Lucky Luke, for taking the cigarette from the mouth of Europe's favourite cowboy and replacing it with a hayseed. By that act he made a powerful point among millions of young readers - that their hero had quit.
- Biman Mullick, graphic designer, and Bombay-born Londoner, for establishing Cleanair, a non-profit organization, and for posters that deliver the message that "non-smoking is the norm."
- Esther Rantzen, hostess of the British Broadcasting Corporation's television programme "That's Life," for an exposé in March 1986 on "smokeless tobacco," a product that is chewed or sniffed, and the way it is being pushed.
- Roger Zabel, host of Telematin on Antenne 2, for being France's first television personality to take a stand against smoking. Anning on 1 June 1987 that he was quitting, he urged viewers to join him in breaking the habit (J'arrête de fumer: fai tes comme moi).
- Jimmy Carter, the 39th President of the United States, for his open letter to the Journal of the American Medical Association. Formerly a supporter of the tobacco industry, he wrote in 1986: "As the scientific evidence has become stronger, I have become increasingly active in attempting to spare people from the tobacco addiction.
- Elman Folkenberg, pastor (posthumously) and Wayne McFarland, general practitioner (retired), for together developing "The 5-Day Plan to Stop Smoking," which has given hope to millions throughout the world striving to break free from the tobacco addiction.
- Good Housekeeping, for the only major women's magazine that has not accepted tobacco advertising during the past five years, and for its editorial position that smoking is the antithesis of womanly qualities, leading to their subjugation rather than, as advertisements claim, their liberation.
- Larry Hagman, for his chairmanship over eight years of the American Stop Smoking. Out of respect for him, tobacco in any form is never portrayed in the world-renowned television series "Dallas," in which he plays the lead role, "J.R."
- Frank King, chairman of the organizing committee of the Winter Games in Calgary, March 1988, for its policy of "fresh air" for athletes, which set an example for the Seoul Summer Games.
- Northwest Airlines, for being the first carrier in the world to fly, from April 1988, regular smoke-free routes internationally from the United States to Canada, Mexico and the Caribbean.
- The Toronto Globe and Mail (and its publisher Roy Megarry) for being the first metropolitan newspaper in Canada to voluntarily close its pages to tobacco advertising, effective from 1 August 1986, on the basis that to not do so would be a violation of the country's code of advertising, which prohibits the promotion of harmful products.
- Patrick Reynolds, grandson of the founder of the tobacco company that bears his name, for divesting himself of all stock in the family business, and for his stated determination to raise con-
quired as an unsuspecting
ous cigarettes
for producing radio spots
aimed at discouraging police
directed at those who want
to help others to stop.
- Lynn Smith, journalist
and formerly publisher of
the weekly Monticello
Times, Minnesota, for
founding the world's first
D-Day (or "Don't Smoke
Day") on 7 October 1974,
which was the inspiration
for the Great American
Smokeout, for tobacco-less
days in other countries, and
for WHO's 1st No To­
boacco Day.
- The Whig Standard
of Kingston, Ontario (and
its publisher, Michael Davies),
for being the first daily
newspaper in all of Canada
to put "its social con­
science before its commer­
cial interests," by voluntarily
closing its pages to tobacco
advertising effective from
1 January 1985.

Latin America, Caribbean

- Ziraldo Alves Pinto,
"Ziraldo," Brazilian cartoon­
ist, for posters of a light and
wry touch that deflate the
myth of the glamour of to­
acco and for donating his
work to his government for
health education campaigns.
- Fidel Castro, President
of Cuba, for at first, in 1981,
pledging never to smoke in
public as a measure to de­
glamorize the image of a
smoker and then breaking
the habit as an example for
his fellow citizens.
- Alberto Kattan, Argent­
tine lawyer, who estab­
lished in a Buenos Aires
court—for the first time ever
in February 1986—the tox­
icity of tobacco and who then
called for an end to
tobacco publicity on the
grounds that his country's
communication law bans
the advertising of unhealthy
products.
- Lorenzo Pepe, Deputy
in the Argentine Congress,
and author of legislation
that, beginning in July 1986,
limits the advertising of to­
acco on television and ra­
tio to between 10 p.m. and
8 a.m.
- Carlos Andres Perez,
President of Venezuela from
1973 to 1978, for presiding
over smoke-free cabinet
meetings.
- Ronald Thwaites, law­
yer and moderator of a daily
call-in radio programme in
Kingston, Jamaica, for en­
couraging listeners to avoid
tobacco, and by so doing
communicating for health.

Europe
- Michela Figini, Swiss ski
champion, 1988 and Wer­
ner Gunthor, Swiss shot
put champion, 1987, for
lending their reputation to
health education posters
saying "Sure, I'm a non­
smoker."
- The Palm Family, Swe­
den, for persisting in the
legal battle begun by Mrs Gun
Palm, a non-smoker, who
Their determination led to
a precedent-setting legal
decision that said "this case of
lung cancer can be clas­
sified as an occupational in­
jury due to passive smoking in
the work-place."
- Kathimerini, a morning
daily in Athens (and its pub­
lisher Eleni Vfachou); and
Politika Themata, a weekly
news magazine (and its pub­
lisher Costas Kyrkos), for re­
sponding to a government
information and education
programme by voluntarily
closing their pages to to­
acco advertising from March
1978.

Western Pacific
- Fiona Harari, medical re­
porter, and Graeme O'Neil,
science reporter of Aus­
tralia's Age, a Melbourne pa­
per, for a series ("Victoria's
Dying Habit") in June 1987,
which played a major part in
the passage of the Tobacco
Act by the Parliament in Vic­
toria, the first legislation of
its kind in Australia.
- Pat Cash, 1987 Wimble­
don champion, for public
service announcements on
Australian television with
the message "Smoking? No
Way!" making the point
that smoking and sports are
incompatible.
- Ryochi Hirayama and
Koichi Yasui, taxi drivers,
for bringing about a change
in transportation laws that
allow drivers in Tokyo to
designate cabs smoke-free.
Their was the first two ve­
hicles to win that right, ef­
- Nobuko Nakano, junior
high school teacher, for
founding the Women's Ac­tion
on Smoking, a group of
civic-minded volunteers
dedicated to raising con­
sciousness about the bles­
sings of a smokeless envi­
ronment in Japan—an act
unique among women's or­
ganizations throughout the
world.
- Ryoichi Sasakawa, Ja­
panese philanthropist, for
swerving support, morale
and financial, of WHO's
Tobacco or Health pro­
gramme, which is making
possible initiatives in public
information and health edu­
cation for the World's 1st
No Tobacco Day.

Africa
- Yidnekachew Tessema,
(posthumously) of Addis
Ababa, and president, up to
his death in August 1987, of
the African Football Confe­
deration, for his campaign
that made the 4th All Afri­
can Games, in Nairobi, the
first ever without tobacco
advertising in government
halls. "How can we ask
African youth to become an
instrument for the propaganda
of tobacco?" he demanded.

Eastern Mediterranean
- Salah Muntassir, column­
ist for the Cairo newspaper
Al Ahram, who, drawing
on his own experience as
an ex-smoker, consistently
writes about the delights of
breaking free from tobacco.

In the next issue
The year that marks the 40th anniversary of the World Health Organiza­
tion is also the tenth an­niversary of the Declara­
tion of Alma-Ata—signed
at the ending of a major
UNICEF/WHO conference on
primary health care in
Soviet Kazakhstan on
12 September 1978. The
August-September issue of
World Health puts both anniversaries in context.

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An Indonesian mother brings her baby to be treated for pneumonia—yet another of the communicable diseases that trouble mankind.

Photo: WHO/J. Leowski