News

Netherlands, first country to legalize euthanasia

Last month, the Netherlands became the first country to decriminalize voluntary euthanasia. Under new legislation a doctor will not be prosecuted for terminating a person's life providing he or she is convinced that the patient's request is voluntary and well considered and that the patient is facing "unremitting and unbearable" suffering.

The doctor must have advised the patient of his or her clinical condition and have reached a firm conclusion with the patient that there is "no reasonable alternative". In addition, at least one other independent physician must have examined the patient and reached the same conclusion.

The legislation reached its final hurdle on 10 April when the Dutch senate voted by 46 votes to 28 to approve the bill. The vote was seen as a formality, after the lower house voted last autumn by 2:1 in favour of decriminalization.

There will be little change in practice, as Dutch doctors have offered euthanasia to terminally ill patients for at least two decades. In 1994, a law was introduced which obliged doctors to report any cases of euthanasia to the authorities, who would then decide not to prosecute if the doctor had followed certain guidelines. Euthanasia still remained a crime, however, carrying a maximum 12-year prison sentence.

The Royal Dutch Medical Association welcomed the move, saying it would resolve the "paradoxical legal situation" and ensure that doctors acting in good faith and with due care would not face criminal proceedings.

Although surveys show that the change in law is supported by 90% of the Dutch population, there were still angry protests outside the parliament building. In the weeks preceding the debate, the senate received over 60 000 letters urging legislators to vote against the bill. The mostly Christian protesters view the measure as an assault on the sanctity of life.

About 3000 cases of voluntary euthanasia are carried out each year in the Netherlands. Mr Rob Jonquierre, managing director of the Dutch Voluntary Euthanasia Society, believes that the new legislation will not lead to a massive increase in the number of cases. He told the *Bulletin*: "We may see more requests, as patients may find it easier to talk to a doctor about euthanasia knowing that the doctor will not now be committing a crime."

But he adds: "One of the main reasons for requesting euthanasia is fear of the dying process. So if patients are confident that a doctor won't refuse euthanasia at a future date this can be very reassuring and can give them the strength to continue."

Belgium could be the next country to change its laws on mercy killing, as a bill to partially decriminalize euthanasia is currently before parliament. In Belgium, 72% of the population is believed to support some sort of death on demand.

The issue of euthanasia is likely to remain high on the medicolegal or ethical agendas of many countries in coming years. One reason, according to some experts, is a growing insistence among patients in many countries on having the final say — in all senses of the word "final" — about their medical treatment.

Another reason is that people are living longer and because of medical advances increasing numbers are surviving with debilitating conditions, such as cancer and heart disease. However, some experts in palliative care argue that advances in palliative medicine mean that more patients should be able to live a pain-free life, thereby reducing the need for euthanasia.

Jonquierre believes it should not be an issue of palliative care vs euthanasia. "The best possible care should be given before the issue of euthanasia arises. However, a discussion of euthanasia should be part of the palliative care package." ■

Jacqui Wise, *London, UK*

Heated debate likely on plan for EU-wide health coordination

In a vote on 4 April, the European Parliament called for the creation of a European Health Coordination and Monitoring Centre (HCMC) — the cornerstone of a proposed new programme that would coordinate and streamline health policies across the 15 member states of the European Union (EU). At the same session, the Parliament also called for an almost 30% increase in funding — from € (euros) 300 million (US$ 256 million) to € 380 million (US$ 336 million) — for the programme, which would run from 2001 to 2006.

Officially termed "programme of community action in the field of public health", the new programme was first proposed last May by the European Commission, the EU's executive body. The Parliament is currently calling for a number of revisions.

The proposed programme would replace eight existing programmes, which each addresses a single public health topic, such as cancer, AIDS and other sexually transmitted diseases, rare diseases, pollution-related diseases, epidemiological surveillance, health education, injuries and accidents, as well as drug abuse.

The Commission's public health proposal, explains Member of Parliament Antonios Trakatellis, "is the first integrated EU venture in this sector. To date, important health topics have been dealt with in a piecemeal fashion, with different problems tackled mainly in isolation from each other". The main goal of the new programme, Trakatellis says, would be to collect and evaluate medical and epidemiological data across the EU, bookmark health-determining factors, including lifestyle, socioeconomic or environmental factors, and elaborate mechanisms by which one could respond rapidly and efficiently to health threats like, say, emerging infectious diseases.

The coordinating centre, the HCMC, that Parliament is calling for would be a clearing house for all types of public health data compiled from across the EU. It would gather data through national health agencies, monitor epidemiological trends and health inequalities, and come up with a catalogue of best health care practices to be provided to all EU citizens. "In order to collect and manage data, you need a functioning coordination centre, which simply wasn't there [in the initial proposal]," Trakatellis says.

In their vote, members of Parliament also included a wish-list of urgent issues the new programme should focus on: they include cardiovascular diseases, mental disorders, age-related neurodegenerative diseases, cancer, respiratory diseases, and AIDS and other sexually transmitted diseases. The Parliament also called for safeguards against exposure to electromagnetic fields and expressed the hope that research under the current WHO programme on magnetic fields would be supported.

The Parliament's revisions, says Trakatellis, would help ensure that this is a sound programme for the entire EU. "Ideally, it would cover just about everything related to public health. I consider it the beginning of a long journey toward the convergence of health policies and services among the member states."

Dr Marc Danzon, the director of the WHO Regional Office for Europe in Copenhagen, welcomes the EU proposal.

The new programme, he says, would be a signal that "the Commission is getting more involved in the sector of public health — and that is good for the work of WHO". Once up and running, WHO is planning to collaborate closely with the EU networks, among other things in order to avoid any duplication of effort, Danzon says. "It's neither in their interest, nor in ours. But the risk really is minor. In the field of epidemiology and public health, there are far too few people and too much data. In fact, there is work for 1000 organizations. The [Commission's] intention is good, the plans are good; now let's implement them together."

But Trakatellis's — and the Parliament's — vision has still a long way to go. The Council of the EU, composed of the responsible ministers of the member states, has its say on the proposal. Then the Commission, the Parliament and the Council have to settle on a compromise.

"The Commission is not ruling out anything for the future but the first priority right now is to get the new programme up and running — which, given its scope, is a massive effort," a Commission spokeswoman, who requested anonymity, told the *Bulletin*. Discussions are under way with other health agencies, including WHO, she added, on a broad range of topics, including what has to be done to make sure that there is no duplication of effort when the new programme goes into effect.

The Parliament's April vote is thus likely to mark the beginning of some heated debate. ■

Michael Hagmann, *Zurich, Switzerland*

Arsenic in water — how much is too much?

The United States is in the throes of a fractious debate about what the permissible levels of arsenic in water should be.

The current US standard of 50 parts per billion (ppb), in place since 1942, is criticized as dangerous by public health watchdogs, who would like to see the level reduced to 10 ppb, a change proposed by the Clinton administration in January. EPA chief Ms Christine Todd Whitman has asked the US National Academy of Sciences (NAS) to review more data and to consider standards ranging from 3 to 20 ppb and has also asked an advisory council to study the potential costs of lower standards. Meanwhile, the current standard of 50 ppb remains in place.

The arsenic found in drinking-water is primarily from natural sources — it leaches into groundwater from rocks and soil. It can also enter the environment as a by-product of industrial and agricultural processes. WHO says prolonged exposure to arsenic in drinking-water causes cancer of the skin, lungs, bladder, and kidneys. In particular, the agency notes in a soon-to-be-published fact sheet, lung and bladder cancers have been observed at levels below 50 ppb — the international standard set by WHO in 1963. In 1993, WHO set 10 ppb as a "provisional guideline value" but notes that on health grounds this value "would be less than 0.01 mg/l [or 10 ppb]".

Countries where arsenic in drinking-water has been detected at concentrations above 10 ppb include Argentina, Australia, Bangladesh, Chile, China, Hungary, India, Mexico, Peru, Thailand, and the US. In at least four of these countries — Bangladesh, China, India, and the US — adverse effects on health have been documented, WHO says. ■

Catherine Dold, *Boulder, Colorado, USA*

In Brief

Polio vaccine not HIV source, four studies show

Findings of four studies reported at the end of April — three in the journal *Nature,* one in *Science* — strongly refute a much-publicised theory that the first cases of AIDS resulted from African trials of an oral polio vaccine supposedly contaminated with the chimpanzee variety of HIV (SIVcpz). British writer Edward Hooper elaborated on the theory at length in his 1999 book, *The River.* Three of the new studies found neither chimpanzee DNA nor genetic material from HIV or SIVcpz in samples of the vaccine used in the trials, as would be expected if the theory was correct. The fourth study suggested that HIV was present in humans long before the vaccine field trials. Put together, these new studies show that the oral polio vaccine was not the source of AIDS. For more information see pp. 1045, 1046 and 1047 in *Nature,* 26 April, 2001 and p. 743 in *Science*, 27 April 2001. ■

And MMR vaccine not a source of autism, US panel says

A 15-member immunization safety review committee convened by the US Institute of Medicine concluded in a report released on 23 April that there is no causal relationship between the measles-mumps-rubella combination vaccine and autism, and "no proven biological mechanisms that would explain such a relationship". Other leading health groups, including the American Academy of Pediatrics, WHO and British health authorities (see *News* story in the *Bulletin*, p. 272, vol. 79, March 2001), have come to much the same conclusion. An MMR-autism link was first mooted in a study published in 1998 in *The Lancet.* Details from www.iom.edu/IOM/IOMHome.nsf/Pages/immunization+safety+review. ■

Petroleum funds to fuel malaria research

ExxonMobil announced in mid-April its support for three malaria initiatives — the Harvard Malaria Initiative (HMI), the Medicines for Malaria Venture (MMV) and the WHO-spearheaded Roll Back Malaria (RBM) programme. The petroleum and petrochemical company is donating US$ 1 million to the HMI, a Harvard School of Public Health initiative focusing on basic research for antimalarial drugs and vaccines, and US$ 300 000 to the MMV, a non-profit foundation that coordinates antimalarial drug development. A further, as yet unspecified, amount will go to RBM to support its antimalarial activities in five African countries — Angola, Cameroon, Chad, Equatorial Guinea and Nigeria — where ExxonMobil operates. For further information, visit these Web sites: www.hsph.harvard.edu/malaria, www.malariamedicines.org, www.who.int/rbm, and www.exxonmobil.com ■

Malaria researchers note: parasite genome now on Web

PlasmoDB, an Internet-based database allowing genomic analysis of *Plasmodium falciparum,* the cause of the most lethal form of malaria, is now available at http://plasmodb.org, two US research teams at the University of Pennsylvania announced in April. The database owes a lot to sequencing work conducted at two US institutions, the Institute for Genomic Research and the Naval Medical Research Center at Stanford University, and to the UK's Sanger Centre. ■

First guidelines out for tackling deadly lung disease

The US National Heart, Lung and Blood Institute, together with WHO, issued in April the first international guidelines on diagnosing, treating and preventing chronic obstructive pulmonary disease (COPD). The guidelines were drawn up by the *Global initiative for chronic obstructive lung disease*, or GOLD, a team of COPD experts from more than 100 countries. Although it is the fourth leading cause of death in the world, COPD has failed to attract the attention it deserves from the international health care community and from governments, says GOLD chair Professor Romain Pauwels. For more information and a copy of the guidelines contact Dr Nikolai Khaltaev (khaltaevn@who.int). ■

WHO News

Polio eradication — the last and toughest 1%

Polio is clearly on its last legs. Figures released in mid-April by officials of the WHO-led global polio eradication initiative show an over 99% drop in estimated cases — from 350 000 in 1988, when the initiative was launched, to less than 3500 last year.

Trouble is, dealing with that residual 1% will be the initiative's toughest task in its 13-year history. And it will be costly. The initiative, which is a coalition of international and national public- and private-sector entities, aims to stop polio transmission worldwide within the next 24 months. Then, by 2005, if no new cases have turned up, a global commission should be able to certify the world polio-free. Implementing that five-year plan will cost US$ 1 billion — 44% for operational expenses, such as transport, social mobilization and other logistic requirements for mass vaccination campaigns, 38% for the vaccine, 11% for disease surveillance and 7% for management, meetings, and the like.

The reason for the high cost is that of the 20 countries where wild polio is still endemic, 10 present formidable obstacles: large populations providing the virus with vast human reservoirs in which to circulate intensively and from which to spread to neighbouring countries (this is the case for Bangladesh, Ethiopia, India, Nigeria and Pakistan) or the presence of military conflict (Afghanistan, Angola, Somalia, and Sudan) or both (the Democratic Republic of the Congo). In addition, all are poor, with fragile or non-existent health infrastructures.

So far, of the needed US$ 1 billion, donors have promised US$ 600 million. Finding the rest is not going to be easy. Eradication initiative officials are concerned that the slew of new global health funds being set up or proposed — for AIDS, malaria, tuberculosis, children's vaccines, and other worthy causes — is creating unprecedented demands on donors. Even without this new competition for resources, fundraising for polio faces an uphill struggle. "It's an unfortunate paradox," says Dr Bruce Aylward, who heads the team running the initiative. "The more successful eradication efforts are, the less visible polio becomes and the harder it is to generate the needed resources to finish the job."

Clearly the eradication initiative *has* been a success. In 1988, polio was present in 125 countries vs at most 20 countries at the beginning of this year. Over this period, an estimated 3 million people would have contracted polio had it not been for the initiative. This translates into an average cost of US$ 500 per case prevented.

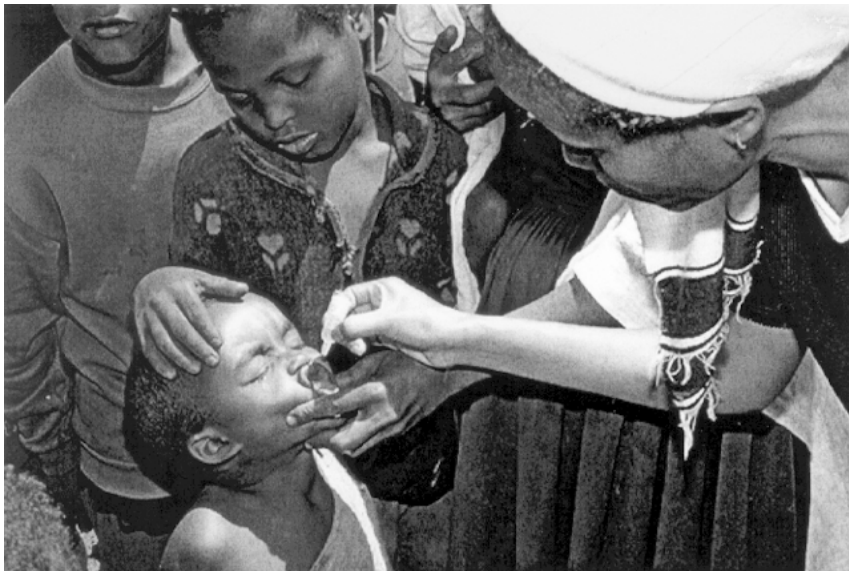
But preventing each polio case is getting more expensive, as the virus retreats into increasingly inaccessible redoubts. Over the next five years, assuming that eradication activities will maintain their momentum, at most 10 000 cases would occur worldwide, eradication officials estimate. That means the cost of preventing each case will probably be about US$ 100 000.

But as Aylward points out, "We're not just talking about preventing cases. We're talking about wiping out an entire disabling disease forever — a disease that every year has been needlessly siphoning off from the world economy about $1.5 billion in vaccination and treatment costs."

Eradication officials are cautiously optimistic that donors and the initiative's partners will come up with the US$ 400 million still needed. But will it come quickly enough to avoid a second postponement of the target eradication date, originally set for 2000? They hope so, as every year's delay adds US$ 100 million to the total bill. ■

John Maurice, *Bulletin*

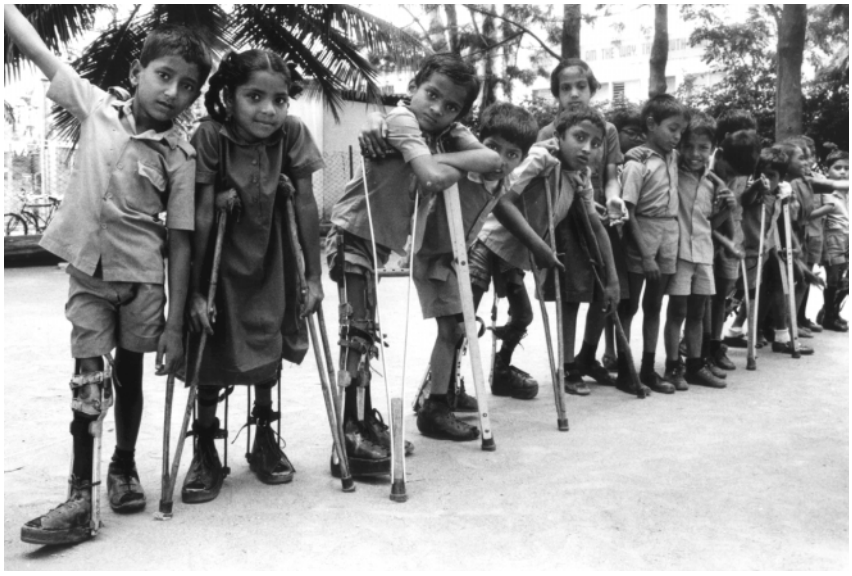
This is the way...



P. Blanc

A child in Ethiopia – one of the 20 countries where polio is still endemic – receives polio vaccine during nationwide immunization campaign in March.

... to end that.



UNICEF

A sad line-up of polio victims in Bangalore, India.

WHO 01.91

Human genome sequences — a potential treasure trove, but how useful?

Imagine trying to understand a country and its culture without knowing its language. Only a comprehensive knowledge of the language would give a newcomer the tools *to begin* to explore and understand the country. Publication of the human genome sequence in February this year (see box) was a little like equipping scientists with the language of the human body.

The scientific community's reaction has been positive, but tempered by uncertainty over the time it will take for practical results to emerge. "Now," says Dr Virander Chauhan, director of the International Centre for Genetic Engineering and Biotechnology in New Delhi, India, "we can truly start to turn the genetic sequences into information important for medicine." But, cautions Dr Barry Bloom, dean of the Harvard School of Public Health in the USA, "there will be a long haul before the human genome is fully exploited — even in the West." And Dr Allan Bradley, head of the Sanger Centre in Cambridge, UK, which is sequencing one third of the human genome, says: "When it comes to disentangling and understanding the human genetic message, we are only at the end of the beginning."

Nevertheless, no one involved in biological research doubts that publication of the human genome is a milestone. Just how the exploration will proceed, though, is anyone's guess and will depend on the complexity of the disease being studied and on the relative needs and resources of each country. "Every country has its own dynamics," says Chauhan. "In India, 50% of the population are TB carriers and we are the world's largest repository for leishmaniasis, so I am advising our department of biotechnology that TB and leishmaniasis as well as malaria and HIV should be our priorities."

Whatever the national priorities, genetic medicine has the potential to produce diagnostics, vaccines, and therapies. Already, there are sequence-based genetic tests of rare monogenetic diseases (i.e. caused by single genes). Huntington's chorea and cystic fibrosis are two better-known examples. These genes, says Professor Newton Morton, professor of human genetics at Southampton University, in the UK, and a member of the WHO committee on human genetics before it was disbanded, are genes which when faulty can alone have a large visible effect.

The Huntington's and cystic fibrosis genes have led to prenatal diagnostic tests and to tests that reveal whether the parents are carriers, but not yet to therapies developed directly from knowledge of the sequence. The catastrophic impact that these monogenetic diseases have and their rarity means that researchers were able to locate the individual genes by family studies, then isolate and sequence the genes. These projects were not part of the wholesale genome sequencing effort, but they showed the potential and limitations of sequence data.

Clearly diagnostic tests are important, but their value is limited, argues Bloom, "if patients do not have access to genetic

Sequencing, genetics and medicine A genome comprises essentially four main types of molecules, or bases — adenine, thiamine, guanine and cytosine — arranged in pairs in a double helical structure. There are 3 billion base pairs and their order carries the instructions to make a human being. Of the entire human genome sequence, only 1.1–1.4% contains genes.

Two sequences of the human genome were published simultaneously in February (see main text). They are roughly 92–94% complete. The published sequences suggest that there are 31 000 genes in the human body, far fewer than originally estimated — vs about 26 000 genes for plants, 18 000 for worms, 13 000 for flies and 6000 for yeast. One sequence was the work of the publicly funded International Human Genome Sequencing Consortium and was published in *Nature* (15 February 2001). The consortium has made its data freely available to the public via the Internet on a daily basis. Its work was undertaken by about a thousand scientists in six countries, including one developing country, China.

The other sequence and its analysis were published by the US commercial company Celera Genomics in *Science* (16 February 2001). Access to Celera's sequence data is more restricted and there has been much controversy and rivalry between the public and private ventures. The question is complex but what is clear is that Celera's entry into the mass sequencing game spurred the public effort to complete its task earlier than it would have done otherwise.

''Making the data publicly available,'' says Dr Virander Chauhan, director of the International Centre for Genetic Engineering and Biotechnology in New Delhi, India, ''has levelled the playing field, so that for the first time a university in New Delhi can compete directly with a university such as Harvard in the States.''

Though the Human Genome Project was conceived in 1985 and began in earnest in 1990, since the beginning of the century scientists have attempted to identify traits passed down through the generations. Then, with the advent of molecular biology tools, individual genes were isolated and sequenced. In the mid-1980s, biologists, mainly in the USA, began to consider sequencing the whole genome. Sequencing began in the late 1980s. About a decade later, the project got under way in earnest, moving away from earlier concerns about the function of genes and concentrating on the sequencing itself.

To transform sequence data into diagnostic tests, vaccines, and therapies, scientists have important questions to answer. Although the location of most of the genes is now known, scientists need to know which gene makes which protein, in which cell and at what stage of life. Then they need to know a protein's specific tasks and how different proteins interact with one another. Equally importantly, researchers want to know how environmental factors influence gene expression.

Now that the human genome sequence is known, the focus is firmly back on gene function, only this time researchers will be learning and exploring with an entire genetic language, not only the few words interpreted from isolated observations.

counselling about the possible consequences of their carrier status or to abortion clinics if needed".

Science targeted the monogenetic diseases first because they could be tackled through current knowledge. The holy grail, however, is to understand the complex noncommunicable diseases — cardiovascular disease, hypertension, diabetes, cancer, mental illness — that affect all of humanity.

Morton, an expert in the genetics of complex diseases, says hundreds of genes are associated with each of these classes of disease, each gene having, perhaps, a small effect. Moreover, extragenetic factors, from diet to pollution to lack of exercise, affect regulation of the genes.

Laboratories around the world are focusing on the complex diseases. Take type 2 diabetes in the general population (as distinct from specific families), which affects adults in both developed and developing countries. To date scientists are not absolutely sure of even a single causative gene (although one gene, called Colpain 10, is a possible contributing cause of type 2 diabetes among Mexican Americans). About a dozen locations on the human genome, however, have been identified where the DNA sequences of people with diabetes are different from those of someone without diabetes. Work to match those sequences with the human genome and to investigate whether the sites are in a region that includes genes or gene sequences regulating gene expression is now under way. The human sequence data are speeding up the process, says Dr Don Bowden, professor of biochemistry and medicine in the human genetic unit at Wake Forest University, North Carolina, USA, but it is hard to say when this work will result in either a therapy or a diagnostic kit.

For the infectious diseases there is an added hurdle: it is not just the human genome that must be understood, but also the genome of the infectious agent and, for malaria and other vector-borne diseases, of the vector. "When we have the complete sequence of the malaria parasite," says Chauhan, "we might compare it with the human genome to find genes that are not present in humans, and then develop a drug that kills the parasite but does not affect the human host."

And then, of course, there are the many ethical considerations that this new technology raises. Among them are questions like: Who is to decide if and when genome data should be used to "enhance" genomes that are basically healthy (a critical question, since such re-engineered genomes could affect future generations)?

The debate on such issues has started. Whatever its outcome, though, "in 20 years time," says Morton, "the sequence data will be central to every branch of medical science." And as US scientist and Nobel laureate Dr David Baltimore of the California Institute of Technology wrote in *Nature*'s special genome issue (15 February 2001), "Although I've seen a lot of exciting biology emerge over the past 40 years ... chills still ran down my spine when I first read the paper that describes the outline of our genome." ■

Helen Gavaghan, *Hebden Bridge, West Yorkshire, UK*

Measles eradication still a long way off

Until recently, many people assumed that once polio had been eradicated, measles would be next in line. Now there are doubts about whether measles could — or even should — be a target for global eradication.

Five years ago, an international meeting of experts sponsored by the US Centers for Disease Control and Prevention, the Pan American Health Organization, and WHO, recommended that the World Health Assembly should consider setting a target for the global eradication of measles some time between 2005 and 2010.

That target date has never been set. Why not?

Not because the disease no longer constitutes a major public health burden. With an annual toll of some 30 million cases and 900 000 deaths, mostly in children, it still does. Measles in fact kills more than half of the 1.6 million children who die annually from vaccine-preventable diseases. And among those who survive measles, up to 10% may suffer disabilities, such as blindness, deafness, and irreversible brain damage.

Nor is it because measles fails to meet the technical criteria for eradication. It does. Humans constitute the only natural reservoir for the causative virus and there are no healthy carriers of the virus (as there are for viral hepatitis, for example). Also, an effective vaccine has been available for over three decades and today costs only US$ 0.26 for a single dose, including safe injection equipment. And finally, natural immunity to the virus is of lifelong duration.

There is also evidence that interrupting transmission of the virus is possible in large areas of the world — a necessary preliminary to eradication. Several regions — foremost among them the Americas — have shown that it is operationally feasible to interrupt transmission of the disease. Transmission of measles virus has almost ceased in the Americas, where it is now believed to be confined to the Dominican Republic and Haiti. Two other WHO regions — the European and Eastern Mediterranean regions — have set targets to eliminate the disease by 2007 and 2010, respectively.

Even in sub-Saharan Africa, where transmission of the virus is intensive and where over half the world's measles cases occur, a handful of countries have made remarkable progress in reducing the number of measles cases and deaths. In six southern African countries, mass vaccination campaigns during 1996–98 reduced reported measles deaths from over 300 in 1996 to only two between January 1999 and September 2000. In Malawi — one of the world's poorest countries — the number of measles cases plummeted from 7000 in 1997 to only two in 1999. And for the first time ever there were no measles deaths.

So why is there reluctance today to make plans to eradicate the disease?

One reason is the ongoing effort to eradicate polio, scheduled for 2005 (five years later than the original deadline) and now in its, hopefully, final but most difficult stage (see WHO News story p. 582). "We have to finish polio eradication before considering measles eradication," says Dr Ana-Maria Henao-Restrepo, medical officer and measles focal point within WHO's vaccine programme. "But in the meantime, we are working with countries throughout the world to reduce measles deaths through immunization plus, where needed, vitamin A administration. There is a lot we can do even before polio is eradicated."

In late March this year, WHO and UNICEF issued a "global measles strategic plan" to halve measles deaths by 2005. Because measles is a highly contagious disease, the new plan calls for immunization of at least 90% of children worldwide, vs the current 74% global vaccine coverage rate. And because the initial dose of vaccine is only about 85% effective in developing countries, the plan recommends a second dose of vaccine for all children, through either routine vaccination or mass immunization campaigns. Improved surveillance and la-

boratory diagnosis are critical, the plan says, if these new targets are to be met. The plan also calls for efforts to improve the management of measles cases, including administration of vitamin A.

In 2005, a global consultation will review progress and decide whether it is technically feasible to eradicate the disease and, if so, whether there is enough political commitment to carry it through. If there is no consensus for eradication at that time, the mortality reduction targets may be stepped up instead.

Another reason for delaying a decision on measles eradication is that not enough is known about several key operational and scientific issues.

Does it, for example, make economic sense to eradicate the disease? Would it not be more cost-effective to maintain high immunization coverage and prevent measles deaths? Would countries be likely to make it a political priority? Also, unlike oral polio vaccine, the measles vaccine can only be given by injection administered by trained health workers. Can such an injectable vaccine be used safely and effectively on a global scale in mass immunization campaigns? Research is currently under way to find alternative ways of delivering the vaccine. These include aerosol delivery, the use of powder vaccines that can be inhaled, and injection by needle-free jet injectors (a multidose jet injector could be available for use within the next five years).

Questions have also been raised about whether the measles vaccine retains its efficacy in children infected with HIV and about the possibility that such children could become long-term carriers of the measles virus, thereby scuppering any chance of eradicating the disease. Research is currently under way on this hypothesis. However, experience in southern Africa, where up to 10% of newborn babies are HIV-positive, suggests that it is not a problem.

In the meantime, commitment among donors to any future measles eradication initiative hangs in the balance. Dr Edward Hoekstra, medical coordinator for measles activities at UNICEF, told the Bulletin that while there is a political consensus on the new mortality reduction targets, donor governments remain divided on the issue of measles eradication. "The problem is that in the western world most children have access to health care and people have forgotten what measles can do," he said. "In developing countries, children with measles often die from complications such as diarrhoea and pneumonia because they don't have access to treatment. The new mortality reduction targets have been established because we have an obligation to these children to act now to prevent these deaths."

All in all, it remains an open question whether measles eradication will get the green light in 2005. Much will depend on the outcome of the polio eradication initiative, on regional attempts to bring the disease under control, and on the answers to the technical and scientific questions hanging over the decision.

For sure, while the world waits for a decision about eradication of measles, the decision to do something right now about the 2500 children dying daily from measles doesn't seem such a bad idea. ■

Sheila Davey, *Geneva, Switzerland*

UNICEF

A girl is immunized against measles by a UNICEF-assisted mobile vaccination team covering villages close to Dili, the East Timor capital, as other children stand in line waiting their turn.

ERRATUM

On page 415 of last month's issue (Vol. 79, No. 5), second column, line 18, "50 000 IU vitamin A" should read "**10 000** IU vitamin A"