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Leprosy: the long hard road

Although progress has been made against leprosy, the disease still exacts a savage toll. Research into all aspects of its control continues to be essential. There is a need to be perpetually aware of the danger that other problems could divert attention and resources from the fight to defeat this scourge.

Leprosy is still a major problem, affecting over 1% of the people in some areas. Treatment became feasible with discovery in 1941 of the activity of the sulfoxones against Mycobacterium leprae, and since human beings were apparently the only significant reservoir of the bacterium the possibility of complete control could be envisaged. Provided all patients were detected early and adequately treated, the prospect existed of eliminating this reservoir. Large-scale campaigns were launched all over the world. Unfortunately, the results did not match the expectations.

There were many reasons for this. Most of the campaigns were not properly integrated into health services; failing a basic infrastructure and community participation, the efforts could not be sustained. The time factor was also overlooked: as demonstrated by epidemiometric models, a significant reduction of incidence cannot be expected until 10–15 years have elapsed, even in the best schemes. Finally, the emergence of strains of M. leprae that were resistant to the sulfoxones thwarted hopes of controlling leprosy with these drugs alone and made it necessary to use multiple drug treatment.

Research and control

Considerable efforts have therefore been made to develop new methods for tackling leprosy, and it is likely that within a few years the whole basis of control will change. Immunoprophylactic and/or immunotherapeutic vaccines are expected to become available. New drugs may be developed to combat multiple resistance. Specific monoclonal antibodies will be used in screening programmes. Novel immunoepidemiological tools should permit the elucidation of environmental factors modulating the transmission of the disease, perhaps opening the way for primary prevention; individuals and groups at risk may be identified for selective vaccination and intensified surveillance. The design of appropriate information systems and the extensive use of microcomputers in the field will help in the monitoring of control activities.

Recent work includes the identification of the specific PGL-1 antigen, the investigation of families of new drugs, and the cloning...
and sequencing of parts of the *M. leprae* genome. In large measure these studies were made possible by two major interdisciplinary research programmes coordinated by the World Health Organization, and by the Special Programme on Research and Immunochemistry and the degree to which research is coordinated make it unlikely that this will occur. Of somewhat greater concern is the testing of leprosy vaccines, whether of the specific killed kind or the BCG-killed *M. leprae* preparation now undergoing trials in several parts of the world. It is by no means sure that these trials will give a final answer. The present strategy of control based on the treatment of the reservoir of patients clearly must be maintained. Even if randomized controlled trials were to indicate that a vaccine had a protective effect, it would be difficult to differentiate between the contributions of vaccination and chemotherapy. Moreover, the countries where this type of trial can be carried out have relatively good health care systems and socioeconomic conditions and therefore have the greatest prospects of a natural decrease in incidence. Differences in attack rates between vaccinated and unvaccinated groups could fall below the established threshold of statistical significance.

The importance of these issues should not, however, be exaggerated. If trials are properly conducted in several countries under different conditions and their results are in broad agreement, it should be possible to make firm decisions. Of course, the development of a synthetic vaccine would call for a complete reassessment of the situation.

### Sustaining the fight

A great danger is that the funding bodies might lose interest and that there might be a decline in the health agencies’ credibility. At present, there is a willingness to pay for laboratory research, especially when a vaccine is at stake. There is less enthusiasm when it comes to testing, particularly as a

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simple trial may cost US$ 1–2 million and one has to wait 10–12 years for the results. Scientists are often like the merchant who trades a camel for a horse, keeping the humps out of sight until the deal is concluded. They should refrain from using flowery language and lay their cards on the table right from the beginning. Clinical trials are necessary, they last a long time, and they have to be paid for.

Other problems include the patenting of drugs and biologicals developed in cooperative programmes, and the marketing of orphan drugs produced by the pharmaceutical industry, i.e., those whose sales do not cover development costs. Such issues are not peculiar to leprosy and may be solved in a legal context. In the meantime, international nongovernmental agencies can play an invaluable role by making these drugs available in countries where leprosy is endemic.

Considerable attention should also be paid to the integration of leprosy control into a proper health system. Primary health care is, of course, the only system that can provide the right mix of efficacy and equity. Health systems research is vital in order to arrive at the best way of integrating leprosy control into primary health care. It should include studies on the role of community participation in leprosy control, the tasks to be given to community workers, the best system at the intermediate level, and the use of new information technologies for monitoring control activities. In some instances, leprosy control can be used to spearhead the development of primary health care.

Leprosy is one of the foremost causes of disablement. It is estimated that 25% of patients who are not detected and treated at an early stage will develop anaesthesia and/or severe deformities of the hands and feet. Whatever the success of the new tools and whichever strategy for leprosy control is considered appropriate, a large part of the available resources should therefore be earmarked for the prevention and treatment of deformities, as well as for rehabilitation. Research is needed on nerve damage and on how best to bring leprosy within the scope of the promising new approach of community-based rehabilitation advocated by the World Health Organization.

In the long term, the main threat to leprosy control might come from changed priorities. At present, because of its prevalence, leprosy remains a high-priority problem in many countries. However, the very success of control could lead to a decline in interest in the disease. In the countries where leprosy occurs extensively, other problems are emerging or may do so. Famine in rural areas is one such problem. On the other side of the coin there are accidents, occupational diseases, and chronic and degenerative ailments associated with economic development, galloping urbanization, unbridled pollution, and upheavals in life-styles. Problems such as these can, to some extent, be foreseen. To them should be added those that are wholly unpredictable, as, for instance, was AIDS. To make full use of the opportunities offered by advances in leprosy research, a determined effort will have to be made to keep this disease at the forefront of people's attention in a world of changing priorities.