Prevalence: a Valid Indicator for Monitoring Leprosy "Elimination"?

In 1991, the World Health Assembly stated that leprosy should be eliminated as a public health problem by the year 2000 (Resolution WHA44.9). Elimination was then defined as a prevalence rate below 1 case per 10,000 inhabitants. Prevalence was chosen rather than case detection because the latter was considered as depending too much on operational factors. The assumption underlying the objective was that, since leprosy is an infectious disease directly transmitted from the patients to the healthy population, a reduction of the prevalence and, thus, of the reservoir would result in a reduced transmission of the leprosy bacilli. This would lead, after a number of years, to a decreased incidence of the disease. Since elimination was defined in terms of prevalence, it seemed only logical to use that indicator to monitor the achievements of the strategy. And indeed it was useful. With multidrug therapy (MDT), patients could be declared cured after a treatment of defined duration; this, accompanied by a systematic review and cleaning of the leprosy registers, resulted in a dramatic reduction in the registered prevalence. From more than five million cases registered in 1985, statistics have gone down to less than 800,000 cases in the year 2001.[1] This is undoubtedly a great achievement: clinics are not congested any more by large numbers of patients who no longer need any chemotherapy, and health workers can better concentrate on the more important issues of detecting and treating the new cases and on preventing the occurrence of disabilities.

In spite of its past usefulness, the prevalence indicator clearly shows its limits now:

- After a dramatic decline, the decrease of prevalence has been slow for the last 5 years.
- Case detection did not decrease as expected: It has indeed increased during the last 4 years, even if a small decline has been observed in the year 2000. The upward trends and the variations observed in the number of newly detected cases can easily be explained by a number of operational factors, such as the extension of geographical coverage by MDT services and the intensification of detection activities through leprosy elimination campaigns (LECs) and other special ac-

[1] World Health Organization. Leprosy—global situation. Wkly. Epidemiol. Rec. **75** (2000) 226–231.

tions. But the fact is that after a number of years of extensive MDT use, we do not consistently and convincingly observe the expected decline in the number of cases detected. Is it just a question of waiting for a few more years? Nobody knows for sure. One could discuss at length the assumption that a decrease in prevalence would automatically be followed by a decrease in incidence. At the time of dapsone monotherapy, prevalence and incidence were following the same trend, and a decrease in incidence was followed by a decrease in prevalence: prevalence decreased as a consequence of the decrease in incidence. This does not mean that a declining prevalence will automatically result in a declining incidence.

At the time of diagnosis, leprosy patients may already have infected all or most of the people surrounding them: It may be that they are detected late; it may also be that some patients are infectious before they develop any clinical sign of the disease. In any of these possibilities, a shortening of the infectious period after diagnosis (as is the case when patients are treated with MDT compared to dapsone) might have a very marginal effect only.

An hypothesis which could in the past be considered as irrelevant is also regaining interest: patients may not be the only source of transmission.[2] The possible role of healthy carriers or of environmental sources of transmission is again questioned.

- Prevalence is too much subject to artificial changes devoid of any epidemiological meaning. The most obvious example resides in the consequences of the reduced duration of treatment. Clearly, a shift from a 24-month to a 12-month treatment for multibacillary (MB) leprosy, which reduces the prevalence of MB leprosy by 50%, has no influence at all on the risk of transmission. With the single-dose rifampin-ofloxacin-minocycline (ROM) treatment, paucibacillary (PB) patients with a single skin lesion do not even enter the prevalence any more, since they are considered as cured on the spot.
- Prevalence does not reflect the actual workload that the health services have to face. Many PB patients detected during a specific year do not appear in a point prevalence, classically calculated at the end of the year; if they were detected in the first half of the year, their treatment may be finished before the end of December.
- In some countries, it is obvious that, even with a registered prevalence rate around or below 1 per 10,000, leprosy remains an important problem, either at the national level because of gross underdetection or in the provinces or states within countries where the disease can remain highly prevalent. In the Democratic Republic of Congo, while the registered prevalence rate was 1.04/10,000 at the national level at the end of 1999, it was 3.49 in the district of Tshuapa and 3.87 in the district of Tanganika.[3]
- With prevalence now more or less at the level of case detection, some countries (Bangladesh and Benin) are not considered as endemic any more on the basis of the registered prevalence, while their annual case detection rate is above 1/10,000.[1]
- Registered prevalence can be very much different from the actual prevalence:

  Coverage of the population by the health services is sometimes very poor.

  In Madagascar, a LEC covering 2.27 million inhabitants was carried out in 1997. It led to the detection of 6810 leprosy patients, while only 1681 cases had been diagnosed in the same districts during the preceding year.[4]

  Another LEC implemented in seven departments in Niger detected 2228 cases, against only 472 in the previous year.[4]

Thus, the question is: "Is prevalence a valid indicator to monitor the leprosy situation?" For me, the answer is clearly "No. It does not measure (anymore?) what it is supposed to measure." Since it is now confus-

[2] Lechat, M. F. The source of infection: an unsolved issue. Indian J. Lepr. **72** (2000) 169–173.

[3] Bureau National de la Lepre. Progres vers l'Elimination de la Lepre (Rapport epidemiologique 1999). Republique Democratique du Congo. Ministere de la Sante. 87 pp.

[4] World Health Organization. Leprosy elimination campaigns (LECs)-progress during 1997–1998. Wkly. Epidemiol. Rec. **73** (1998) 177–182.

ing and misleading, it would be better simply to abandon it.

The situation we will have to face in the coming years is completely different from that which existed in 1991. Prevalence has gone down, and detection figures, with their own limitations, appear from now on much more appropriate. We will now have to verify the assumption that once the prevalence has been reduced to a defined level, the disease will disappear naturally.[5] Since the ultimate goal of the elimination strategy is to reduce transmission, the relevancy of case detection to monitor the success of the strategy is much higher than that of prevalence. Tuberculosis control programs do not bother collecting data on prevalence. The reports they request deal with detection figures and treatment outcome.[6] Do we need much more for leprosy? As long as there remain new cases to be detected in significant numbers, leprosy remains an important problem. We all know that detection figures are influenced by operational factors (but so are also, indirectly, the prevalence figures) and give only an approximate indication of the actual incidence. We all know that not all the newly detected cases are new cases: a proportion, or even sometimes a majority of them, may have been ill for a number of years; they are the so-called "backlog" cases, but if they exist in significant numbers, it means that leprosy services are still far from satisfactory. We all know that the number of patients detected increases if detection surveys are more frequent; some self-healing cases are then detected who would not have been detected otherwise. That is why case-detection figures may not be analyzed separately but in conjunction with other data. Knowledge of the activities carried out will be the first help to disentangle the interpretation problem. But other indicators will also be of invaluable assistance:

- Analysis of the trends in case detection will always be much more informative than one-time data.
- The proportion of new cases with disabilities can give a rough idea about the delay before detection. In case of a stable proportion of new cases with disabilities, the trend in case detection can be considered as reflecting with enough reliability the actual trend in incidence.
- The proportion of children among the new cases is an additional indicator; many children developing the disease undoubtedly means active transmission.

Let us not forget one more thing: Leprosy is important because it is disabling. The monitoring system used in any endemic country should thus also help us to analyze how many patients still develop new disabilities in spite of the control program and how successful we are in preventing disabilities.

I already hear the criticisms which will say: "How will we classify the countries as high endemic or low endemic?" I am tempted to answer with another question: "Do we really need to classify the countries into such groups?" Is it not a matter for each country to decide what importance it wants to give to leprosy and its control, in view of the situation itself of course, but also in view of the other health problems it has to face, and the financial and technical possibilities to tackle them?

—Etienne Declercq, M.D.

Damien Foundation
Boulevard Leopold II, 263
1081 Brussels, Belgium

[5] World Health Organization. *Guide to Eliminate Leprosy as Public Health Problem.* 1st edn. Geneva: World Health Organization, 2000.

[6] Enarson, D. A., Rieder, H. L., Arnadottir, R. and Trebucq, A. *Management of Tuberculosis; a Guide for Low Income Countries.* 5th edn. Paris: International Union Against Tuberculosis and Lung Disease, 2000.