

## LEPROSY: PAST, PRESENT AND FUTURE

Thank you for inviting me to participate in this International Seminar and speak about situation of leprosy in the past, present and future.

I work at the University of Aberdeen which was founded by the Bishop of Aberdeen on the authority of the Bull of Pope Alexander VI in 1495. It was modelled on the Universities of Paris and Bologna and established the first chair of Medicine in the English speaking world.

**Historical view of leprosy:** The first descriptions of leprosy can be found in ancient India and Egyptian writings. Leprosy spread through out the world and reached a peak in Europe in the 14th century - then gradually reduced up to the 20<sup>th</sup> century.

The cause of leprosy, *Mycobacterium leprae* was established by Armeur Hansen in Norway in 1873, but it was not until the 1940s that effective treatment was discovered. Major developments in re-constructive surgery for leprosy took place in the 1950s. In the 1960-70s efforts began to control leprosy in the community using dapsone.

In 1964 resistance to dapsone treatment was first identified and by 1977 dapsone resistance was reported in untreated patients. Multidrug therapy (MDT) was recommended by the World Health Organisation in 1982 to combat the problem of drug resistance. This not only proved successful but the shorter treatment led to a fall in the number of patients registered for treatment.

This fall inspired the World Health Assembly in 1991 to resolve to “eliminate” leprosy which means, to reduce the prevalence of leprosy to less than 1 in 10, 000 by 2000 through detecting cases early and MDT treatment.

**Present Situation:** There has been a 85% reduced in registered cases and over 70 countries have reached the target of reducing the prevalence of leprosy to less than 1 in 10 000. At the beginning of 2000, there still remain about 10 countries which have not reached the target and a commitment has been made to achieve this by 2005. However, does this mean that all the problems of leprosy been solved? Is every patient being detected and treated? Does MDT answer all the needs of those affected by leprosy? Are there any new cases still occurring? I shall try to provide information about all these aspects. The **figure 1** shows the global trend in registered cases (Prevalence) between in the period 1985 to 1998.

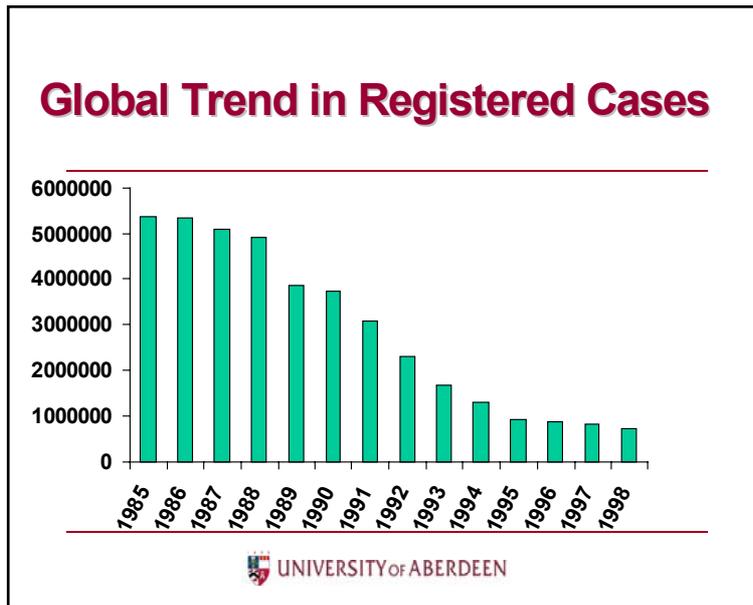


Figure 1

The implementation of MDT world wide has led to a reduction in the numbers of registered cases as seen in this graph. This can be seen in all countries throughout the world. The decline has been by about 85%. However the decline has levelled off in the last 4 years.

Now lets look at the trend in the new case detection rates in the same period in **figure 2**.

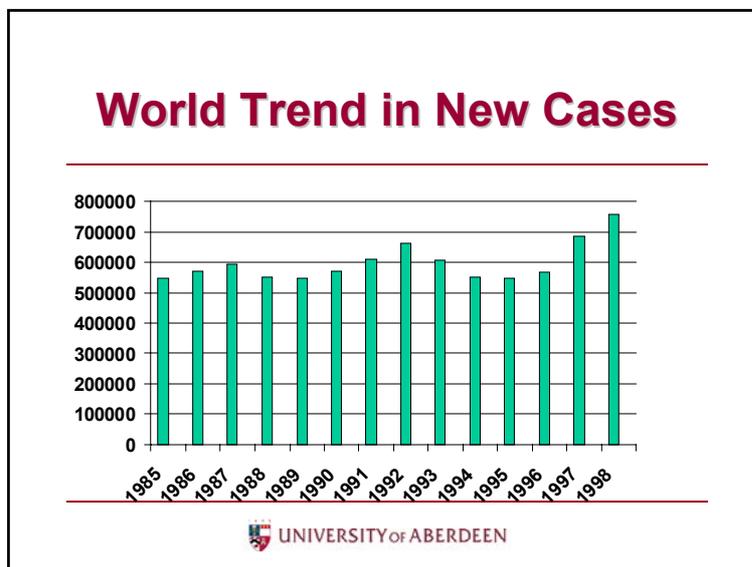


Figure 2

The success of MDT and the reduction in registered cases might lead us to expect that the incidence of new cases would be falling too. This graph shows the trend in new cases since 1985. Clearly we see that is no reduction, indeed the numbers appear to have increased in the last few years. This presents the interesting but confusing pattern - falling prevalence of registered cases of leprosy and constant or increasing incidence in new cases. Why is this happening? What is going on? What is the explanation?

What is happening is that with MDT, we are shortening the duration of disease by using short course therapy. MDT is used for 6 or 12 or 24 months, much shorter than dapsone therapy which could be more than 10 years. If duration falls, then prevalence (number of active cases registered at the end of a year) can fall without any change in incidence of new cases.

If we think of complete victory over leprosy, which means disease eradication, that would be aimed at reducing new cases, in reduced transmission of disease. It had been hoped that by treating all new cases with MDT that the incidence of new cases of leprosy would eventually fall but that has not yet happened.

The global trends in new cases detected covers up important differences between countries. India shows a similar pattern of increase as in the global picture, with a larger increase in the last few years. India represents more than 80% of the global cases and therefore has a great influence on the world picture.

Let us look at the patterns of new case detection in a number of countries. There has been a considerable decrease in new case detection in China - more than 50% in the last 10 years. This contrasts with the global pattern.

In contrast Bangladesh shows a rapidly increasing trend in new cases detected. This would not have been predicted from the changes in prevalence in Bangladesh which has fallen. This is due to the expansion of leprosy control activities to areas of Bangladesh which were not previously covered.

Brazil shows a very consistent pattern of increasing numbers of cases detected as seen in Bangladesh. This is a large effect over a short period of time. Again it is due to improvements in the leprosy programme in Brazil and increase in coverage in the individual States.

The trend in new cases in Colombia shows a downward trend over the same time period. I spoke to the leprosy programme manager in Colombia who described the difficulties for leprosy activities caused by the civil disruption in that country.

This shows that new cases detection is strongly influenced by operational factors and does not necessarily represent true incidence. Case finding methods affected the numbers of new cases detected. Earlier case detection increases the numbers. Improved geographical coverage also results in increase in new case detection rates. Better information systems and data collection, also results in increased new cases detection rates.

To have real picture of the disease transmission, we have to look at some other factors like the number of new cases in children which reflects the risk of disease transmission in a community. **Figure 3** shows the trends in new case detection.

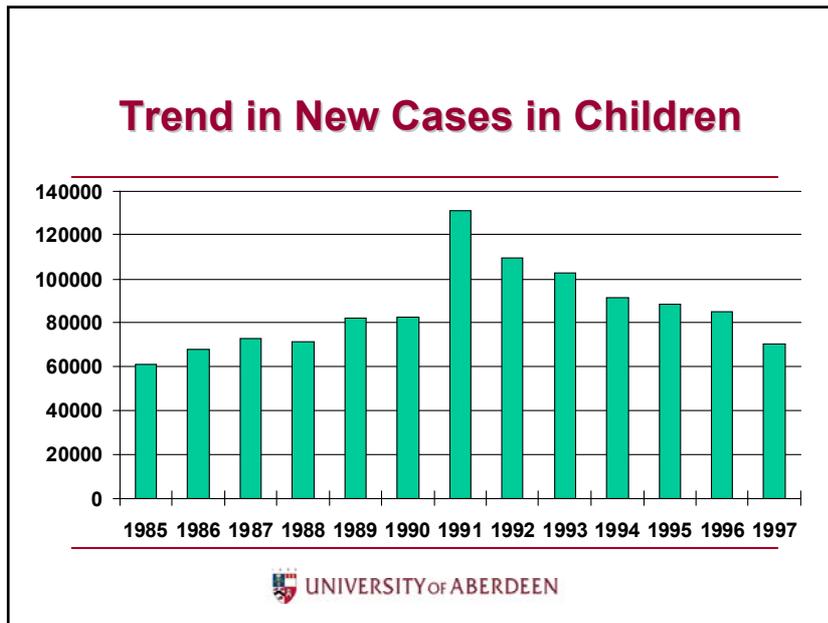


Figure 3

Changes in new cases in children has been considered an indicator of trends in transmission. If transmission of disease stopped then we would see the affect on reduced cases in children. These are difficult to understand as the number of new cases in children increased between 1989 and 1994 while after this period, the numbers have gone down but this may be also due to changes in school surveys.

Another information which may give us an idea about the real situation of new cases is the trends in visible disability in new cases. Globally this data shows a downward trend. This means that cases are being detected earlier now than 10 years ago. This would be associated with an increase in the numbers of new cases detected.

We can see this clearly in the data from India - the increase in new cases is matched by a decline in disability in new cases. The increase is therefore likely to be due to better case detection methods in India.

This is not the case if we look at the global data without India. Here we see that the numbers of new cases who are visibly deformed at the time they are first detected is markedly increasing - threefold. The world data hides a large variation between countries which is important to recognise, as shown in **figure 4**. It shows that in many countries, the number of persons with visible disabilities at the time of diagnosis is increasing and this means that case detection activities are delayed.

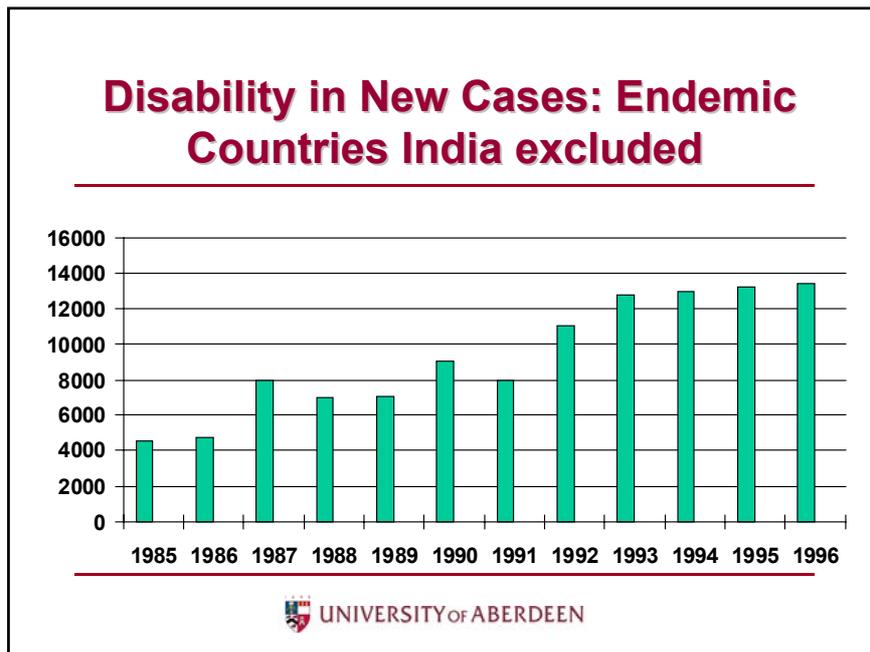


Figure 4

One of the greatest achievements of the past decade is that over 10 million patients have successfully completed MDT. However most of these people are still alive and several million of these have impairments and disabilities.

**Future Priorities:** This leads us directly into the important questions of the future priorities in leprosy. There are three obvious issues which directly arise from the present situation:

- ◆ The continuing occurrence of new cases means that the first priority is the need for these cases to be detected early and treated effectively to cure leprosy and prevent disability. If we fail to do this then the prevalence of leprosy will start to increase and all that has been achieved will be lost. The importance and the scale of this must not be underestimated - it requires the availability of MDT drugs, and the efforts of health care staff reaching hard to reach people, and the participation of their communities.
- ◆ Leprosy is a disease which has physical, social and economic consequences for those affected. So rehabilitation is the second priority.
- ◆ The third priority is research.

Research in leprosy had reduced in the last 10 years but in the last few years the importance and relevance of new research has been appreciated. The Genome Project, sequencing the genetic material of *Mycobacterium leprae* will be completed at the end of January 2000 - this is already opening up new potential for research.

In the past few years research into nerve damage in leprosy has improved our understanding of this and there is the prospect of preventing nerve damage in leprosy. Finding ways of preventing transmission of leprosy is a critical research priority. New research methods are being developed and vaccine and chemoprophylaxis options are being studied.

We need to understand the factors which can influence the **transmission of leprosy** incidence. There are 3 groups of factors which influence transmission of leprosy:

- ◆ Agent factors - Mycobacterium leprae
- ◆ Environmental factors
- ◆ Host factors – people

There are many environmental factors which can influence the incidence of leprosy. Socio-economic development is linked to falls in leprosy as we have seen in many countries. These may be the factors which led to the disappearance of leprosy from Europe. Some believe there may be environmental reservoirs of leprosy but there is little evidence for this.

There are also host factors which influence the incidence of leprosy like: Immunity such as vaccines or infections with other mycobacteria; Susceptibility - so far HIV/AIDS has not been shown to be a major factor; Exposure to leprosy bacilli in households and other contacts. Drug treatment is another factor which may influence the incidence of leprosy.

Others factors include drug resistance and relapse rates and the survival time of the organism out side the human host. So far there is little evidence that these are important problems.

**If we continue with MDT treatment, when can we hope for victory against leprosy?:** The following figure (**Figure 5**) shows that it may need up to 20 years to have significant decrease in new case detection rates of leprosy.

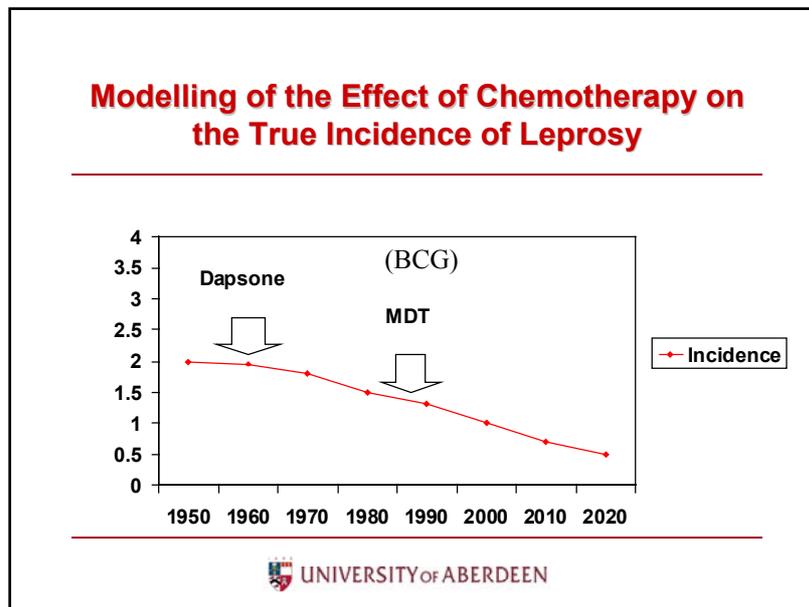


Figure 5

This graph is based on the SIMLEP disease model produced by colleagues in Rotterdam. It uses existing understanding of leprosy and predicts a gradual effect of drug therapy and BCG vaccine in reducing incidence of leprosy over a long period of time. Research is needed into ways of increasing the fall in transmission and the incidence of new cases.

### **The three important principles for leprosy work in the future:**

1. Sustainability - new cases of leprosy are continuing and many of the consequences are lifelong so our approaches need to be sustainable.
2. The leprosy workers cannot do everything themselves- they need to work in alliances at all levels with other agencies, other health care workers, social services, communities, patients themselves and their families.
3. Anti-leprosy services need to be integrated with general health and social services – this includes training, primary health care, hospital care, and community based rehabilitation.

To **summarise** this presentation:

1. The PAST has been characterised by caring for those affected by leprosy without any effective treatment.
2. The PRESENT era has seen the development of highly effective treatment for leprosy and millions of patients successfully treated. This has led to the dramatic reduction in the prevalence of registered cases but so far no reduction in new cases at a global level.
3. The priorities for the FUTURE are: that all new cases of leprosy are detected early and treated properly; the physical, social and economic rehabilitation of those affected by the consequences; and research into reducing transmission of leprosy and prevention of nerve damage.

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