Current challenges in leprosy research

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Introduction

Leprosy is an infectious disease caused by Mycobacterium leprae; it is uncommon but widespread globally and remains an important cause of peripheral neuropathy, especially in poor communities. An important reason to pay continued attention to leprosy is that, in contrast to many more common causes of disability, the impairments caused by leprosy are preventable through quite simple interventions, if identified early enough. In addition, it is well recognized that the stigma and psychosocial problems associated with leprosy cause immense suffering that is not easily measured.

There are many areas of current interest in leprosy research, so this article will focus on areas of more immediate operational importance for leprosy control.

The neglected tropical diseases (NTDs), of which leprosy is one, are now receiving attention on two fronts. First, as infectious diseases, innovative ways to reduce transmission to new hosts and, thus, reduce the future burden of disease in populations at risk are being developed. For several NTDs this can be done through annual mass drug administration (MDA); in leprosy, there are encouraging new developments in the prevention of transmission through chemoprophylaxis,1 which need further research, as outlined below.

The second area in which further work is needed for many NTDs is morbidity management. Many NTDs cause chronic illness and disability; while interruption of transmission will help future generations, new ways to reduce the suffering of those already infected should also be promoted. Disability prevention has been an important area of research in leprosy and other conditions for many years, but there has been little cross-fertilization of ideas across diseases until recently. The challenge now is to apply the lessons learned to a whole range of diseases in an integrated manner, and to disseminate this knowledge and expertise at the community level.

Interrupting transmission

There is good evidence that leprosy is transmitted from person to person in the course of normal social interaction. Moet et al.2 showed that the risk of infection was highest in household contacts of index cases, lower in neighbors and social contacts, and lowest in people with no known contact with a person with leprosy. Because leprosy cannot be grown in vitro, the exact dynamics of transmission are not known, but they are gradually becoming clearer through strain typing, which has shown, for example, that leprosy in armadillos in Louisiana and Texas (USA) is the same strain as that found in people in the same areas.3 There is no evidence that an animal reservoir is important elsewhere, but strain typing is being used to look at transmission patterns between people in endemic areas, such as the island of Cebu in the Philippines.4

Transmission cannot be measured directly, but the campaign to eliminate leprosy based on case-finding and chemotherapy, given increased momentum by a World Health Assembly resolution in 1991, assumed that as prevalence declined, transmission would be reduced gradually to insignificant levels.5 The most easily measured indicator suggesting ongoing transmission is the incidence of leprosy in children, which has declined in some areas while remaining high in others.6 It is now believed that in many situations, leprosy is transmitted to contacts before diagnosis and, thus, before treatment can be started. New cases continue to be reported in children in over 100 countries and this has led many to see the need for a new approach to interrupting transmission. Chemoprophylaxis with a single dose of rifampicin reduces leprosy in contacts by over 50%1. BCG is given to contacts in Brazil, but the evidence for its effectiveness is equivocal.7

The International Federation of Anti-Leprosy Associations (ILEP) has recently overseen the development of a contact-centered strategy to reduce leprosy transmission.8 This document calls for research in five key areas:

- operational research into the management of index cases and their contacts
- identification of biomarkers for leprosy infection and the development of appropriate diagnostic tests
- implementation research into the use of chemoprophylaxis in routine settings
- further development and testing of a new subunit vaccine for leprosy, as an alternative to BCG for immunoprophylaxis (a new...
vaccine for leprosy has been developed by the Infectious Diseases Research Institute, Seattle, USA, with funding from American Leprosy Missions; the vaccine is now entering Phase 1 trials

• further study of the molecular epidemiology of leprosy, using strain typing, in order to monitor the effect of interventions on transmission.

This research programme has the potential to impact leprosy transmission in a more proactive manner than has been possible up to now.

**Morbidity management**

Considerable expertise has been gained over many years in the management of the disabling consequences of NTDs such as lymphatic filariasis, Buruli ulcer, leprosy and trachoma. There is much overlap amongst the first three of these, as they deal with similar issues such as skin and ulcer care, oedema management and mobility. There is a great need, however, to simplify the basic principles and then decentralize the skills to affected communities. This could be combined with simple instructions about how to suspect and refer new cases.

One attempt to teach the basic principles of case management in Buruli ulcer at community level has been the ‘10 Tasks’, developed with the participation of health workers, community volunteers and patients in Ghana and Côte d’Ivoire. Operational research and pilot studies are need to roll out these measures across diseases and across communities.

**Conclusion**

New approaches to NTD control have stimulated new thinking about leprosy—particular challenges relate to innovative ways to interrupt the transmission of leprosy and, secondly, the need for an integrated approach to morbidity management across several diseases.

**Competing interests:** None declared.

**References**


