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Is prevention better than cure?

Vector control makes a come back

Vector borne diseases, including malaria, dengue, Chagas disease, leishmaniasis and sleeping sickness, account for approximately 17 percent of all infectious disease worldwide. Vector control methods such as insecticide treated bednets and indoor spraying have proved highly effective at disease prevention but currently receive little investment.

The Liverpool School of Tropical Medicine, UK, and the World Health Organization traced the history of vector control. They found that, after the discovery of synthetic insecticides in the 1940s, large-scale programmes brought most of the major vector borne diseases under control. By the late 1960s, countries outside Africa no longer considered them to be major public health problems.

Other factors which contributed to the decline of vector control included technical complexity, costs and logistical problems, as well as environmental concerns about insecticides. Support for vector control declined and so resources decreased and programmes collapsed. Health authorities trained and employed fewer specialists. Within two decades, many vector borne diseases had re-emerged or spread to new regions.

However, the study identifies positive developments which suggest that support for vector control programmes is growing again. They highlight the use of integrated vector management (IVM), the recommended strategy for using vector control in sustained and ecologically-sensitive ways which also take into account human behaviour. IVM relies on evidence-based interventions, suited to local settings and aims to engage with communities and encourage collaboration within the health sector and with other sectors, both public and private.

Other positive developments include:

- Insecticide-treated bednets (ITNs) for preventing malaria, the first major tool for vector control in more than 50 years.
- Long-lasting insecticide traps for the tsetse fly, to prevent transmission of sleeping sickness. For dengue prevention, treated covers for water storage jars, treated curtains and controlled-release larvicides (substances that kill insect larvae), although these require further testing.
- Partnerships with the commercial sector to promote ITN use.
- New technologies for producing long-lasting insecticide treatment.

The authors advocate a move towards decentralisation and collaboration between the health sector and other sectors, using the IVM approach, allowing for efficient management of vector control programmes at the district or local level. However, they conclude that effective vector control will continue to require national support from policymakers, alongside improvements in health systems, particularly human resources. They recommend:

- giving priority to research for measuring the efficacy and effectiveness of new insecticides, formulations and applications
- integrating vector control activities with other public health and development activities, for example broad based environmental programmes, and collaboration with farming groups in rural areas to improve pest management
- addressing the risk of vector borne disease in impact assessments for new infrastructure projects such as dams and irrigation schemes, forest clearance, roads and urban development
- learning from the example of countries where highly successful vector control programmes have not been sustained
- increasing investment in vector control and coverage.

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Family members observe TB treatment in Nepal

Direct observation of treatment is a key component of the DOTS strategy for tuberculosis (TB) control. Until very recently World Health Organization (WHO) guidelines have actively discouraged supervision of drug-taking by family members. But research in Nepal suggests this could be a useful strategy in remote areas.

The aim of supervised drug-taking is to help TB patients complete treatment and to prevent resistance to anti-TB drugs. Direct observation of treatment by health workers is not suitable for areas with poorly accessible health services. Observation by family members could address concerns such as the cost, inconvenience and stigma associated with visiting a health centre or community volunteer, and support patients to complete treatment.

Researchers from the UK's University of Leeds and Nepal's Health Research and Development Forum (HERD) compared two strategies in mountain districts of Nepal. In five districts, female community health volunteers or village health workers supervised daily drug-taking by 549 patients. In another five districts, 358 patients took drugs under the daily supervision of their chosen household member.

Key results of the study are:

- Community and family-based DOTS have success rates (cure or completed treatment) of 85 and 89 percent, respectively.
- Non-completion and death rates are similar in the two groups.
- The estimated proportion of expected new TB cases found through the community strategy is 63 percent and 44 percent with family-member DOTS, substantially lower than the WHO target of 70 percent.

These results show that both strategies can reach international targets for treatment success. They might also be suitable in other parts of the world where direct observation of treatment by health workers is not feasible due to difficult terrain, isolated areas or conflict. However, overall HIV rates are low in Nepal, so these results may not apply to areas of high HIV prevalence.

To avoid delays in problems being identified without daily contact with health workers, the researchers recommend health staff should:

- ensure that treatment observers record and report drug side effects to them
- encourage patients to discuss their problems and needs with them
- periodically visit a sample of patients at home to discuss these issues.

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Can Tanzania's malaria control strategy profit from private drug sellers?

Many African countries are adopting malaria control policies based on artemisinin-containing combination treatment (ACT). Research in Ikwiriri in Tanzania's Coast Region shows that specialist drug stores could be key to expanding treatment coverage.

Malaria control in Tanzania relies on prompt, effective treatment of malaria among children under five. Specialist drug stores could be useful for expanding access to these drugs because they:

- often operate in rural centres lacking pharmacies
- sell medicines not available at general shops
- have staff members with some medical training
- are fewer in number and more stable than general stores.

But there are worries about safety and the potential for drug resistance if new ACTs are used unsupervised. To examine the potential role of these shops, researchers from the Ifakara Health Research and Development Centre, Tanzania observed 2,466 client visits to all ten drug stores in Ikwiriri. One in five visits was by or on behalf of people ill with fever or malaria. Of these, 293 were local residents who were interviewed, examined by a clinical officer and given a blood test for malaria.

The researchers found that:

- Only 50 (17 percent) bought an anti-malarial drug, most commonly a product containing sulfadoxine-pyrimethamine (SP). None bought products containing chloroquine or artemisinin derivatives. More than three quarters bought an anti-fever drug.
- Clinicians diagnosed malaria in 64 percent – by far the most common diagnosis, followed by acute respiratory infections, anaemia and gastroenteritis.
- Malaria parasites were found in blood from a quarter of patients, double the level in the local population but similar to the proportion among people with fever visiting health facilities.
- The drug store was the first source of care for nearly three quarters of the customers. Only ten percent had already contacted a formal health facility.

Even in Ikwiriri, where health facilities have improved and highly effective ACTs are available free of charge, many people choose to visit drug stores for malaria treatment. So engaging drug sellers might be essential when introducing ACTs. The Tanzania Food and Drug Authority intends to replace drug stores with Accredited Drug Dispensing Outlets (ADDO), which will receive training, supervision and access to quality-assured products, including some prescription-only medicines, and will meet minimum standards. They could provide an opportunity for expanding access to affordable effective malaria treatment. To maximise the benefit from this, the researchers recommend:

- improving malaria diagnosis to reduce the over-diagnosis common with clinical assessment alone
- encouraging the sale of suitable doses of effective anti-malarial treatments at specialist drug stores, in place of or in addition to anti-fever drugs
- training ADDO staff to avoid potentially harmful practices, such as the inappropriate use of antibiotics and the sale of single drug therapies for malaria
- enhancing the appropriate availability of antibiotics for childhood pneumonia
- committing substantial resources to rolling out the ADDO scheme nationwide.

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Hib vaccination breakthrough in The Gambia

Routine Haemophilus influenzae type b (Hib) vaccination of infants in The Gambia began in May 1997 after a successful clinical trial. Surveillance in the western half of the country shows an impressive fall in Hib disease rates.

Success in a clinical trial does not guarantee that a vaccine will be effective in routine use. Poor storage and transport conditions can reduce vaccine efficacy. By contrast, 'herd immunity' can make vaccination more effective in a larger population. Finally, widespread immunisation can change disease patterns. Researchers from the Medical Research Council Laboratories in Banjul investigated all these possible effects of the Gambian programme.

Between May 1997 and April 2002, they checked 5,984 children for possible Hib infections. Forty-nine had Hib disease of whom 36 had meningitis, eight had pneumonia and five had septicaemia. The researchers found that:

- Fifty-seven percent of Hib cases had not received the vaccine, 35 percent had received only one dose, four percent had received two doses and four percent had received three doses.
- The number of children with Hib meningitis decreased from 36-40 cases per year before the vaccine was introduced, to 22 in 1997/8 and three in 2001. No cases of Hib disease have been identified in the western region since 2002.
- The annual incidence rates of Hib meningitis dropped from over 200 per 100,000 children under one year before any use of the vaccine to zero in 2002 and from 60 to zero cases per 100,000 children under five years old.
- Over the same period, the proportion of healthy children carrying the Hib bacterium dropped from 12 to 0.25 percent.
- The estimated vaccine efficacy against meningitis after two doses was 93 percent and there was no apparent benefit from an extra dose. Efficacy after a single dose was only 35 percent and not statistically significant.
- Routine use of Hib vaccination has not led to unexpected forms of Hib disease in children over two years.

Two doses of vaccine were needed for direct protection from Hib disease. But most children had their second dose too late to be protected directly. Most of the reduction in disease rates is likely to be due to indirect effects, probably because there are fewer carriers.

Routine immunisation was stopped from time to time because of a meningitis vaccination campaign and irregular supplies of vaccine. Despite this, vaccination has cut the spread of Hib almost to zero. The researchers draw the following conclusions for health policy in The Gambia and other countries:

- Virtual elimination of Hib disease is possible in a developing country setting with an immunisation programme that is effective but not perfect.
- Surveillance will be needed where booster jabs are not given, to ensure that the effect of national immunisation with Hib vaccine is sustained.

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