



The Millennium Development Goals

The evidence is in: deworming helps meet the Millennium Development Goals

Schistosomes and soil-transmitted helminths have few rivals in terms of prevalence. They occur throughout the developing world, but are most commonly seen in the poorest communities. WHO estimates that around 2 billion people are currently infected. Of these, some 300 million suffer severe and permanent impairments as a result.

While these figures are not reflected in huge numbers of deaths, the consequences for health and development are enormous. Apart from permanent organ damage, worm infections cause anaemia, poor physical growth, poor intellectual development and impaired cognitive function. They do so at a critical time in life: infection reaches maximum intensity in the age range of 5 to 14 years.

Today, control of these infections can be achieved through regular treatment with inexpensive, single-dose and highly effective drugs so safe they can be given to all groups at risk. Deworming drugs are almost irresistibly

affordable. A dose of benzimidazoles costs US\$ 0.02. US\$ 0.20 buy an average dose of praziquantel.

While schoolchildren have been targeted as a priority group for treatment, recent evidence indicates that preschool children and pregnant women likewise benefit greatly from regular deworming. Technical problems associated with large-scale chemotherapy campaigns have been solved, and control in all

settings is now feasible. Few other conditions, associated with poverty and perpetuating poverty, can be so easily alleviated, for a fistful of pennies per person.¹



Preschool child receiving a deworming tablet in the Lao People's Democratic Republic

Goal 1: Eradicate extreme poverty and hunger

Deworming boosts the prospects of school-age children to earn their way out of poverty.^{2,3} The improvements in intellectual development and cognition that follow deworming have been shown to have a substantial impact on professional income later in life. Studies conducted in the USA estimated the benefits of a hookworm-free childhood at around 45% of adult wages.⁴ When these estimates are applied to a developing country like Kenya, studies show that deworming could raise per capita income from the present US\$ 337 per person to approximately US\$ 490 per person.^{4,5} In Japan, successful deworming programmes in the 1950s are considered one reason for the country's subsequent economic boom.⁶

The impact of inadequate nutrient intake is amplified by worm infections, which interfere with nutrient uptake and are a major cause of anaemia.^{7,8} Malnourished children become more malnourished when infected with worms. The effects of deworming are dramatic, as illustrated by a large study conducted in India. Six-monthly deworming was able – within two years – to prevent 82% of the stunting that occurs without intervention; dewormed children showed a 35% greater weight gain.⁹

Goal 2: Achieve universal primary education

In 2003, a report to the United States Congress on the world economic situation concluded that in developing countries treatment of schoolchildren with deworming drugs can reduce primary school absenteeism by 25%, leading ultimately to higher wages.¹⁰ This finding agrees with data on United States schoolchildren, which showed a 23% drop in school attendance in children infected with hookworm.⁴ Moreover, when compared with other measures for improving school attendance, deworming was ranked as by far the most cost effective.^{2,3}

The evidence is most compelling when viewed at the global level. Of the estimated 562 million school-aged children in the developing world, worm infections are estimated to cause around 16 million cases of mental retardation in primary school children and 200 million years of lost primary schooling.¹¹

Goal 3: Promote gender equality and empower women

A girl's best head-start in life is a good education. It is also her best chance of finding employment outside the agricultural sector. Although the gender gap in education is slowly closing in the developing world, the percentage of boys in schools still outnumbers that of girls. Deworming programmes, especially when associated with other simple measures such as school meals and take-home rations, have been shown to contribute to school

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enrolment by girls and to improve their drop-out and retention rates. In 2000 a pilot project in Nepali schools, involving deworming tablets, a hot noon meal and food gifts for girls to take home, resulted in a 43% growth in school enrolment by girls. In addition, anaemia vanished.¹²

▶ Goals 4, 5: Reduce child mortality, improve maternal health

Worm infection weakens very young children in ways that increase their vulnerability to infectious diseases. Recent studies conducted in areas where malaria is a major childhood killer show that deworming and the resulting reductions in anaemia improve the chances of surviving severe malaria. The large reductions in wasting malnutrition and anaemia that followed deworming contributed to the survival as well as development of these children.^{13–15}

Poor nutrition in general and anaemia in particular are the main underlying causes of poor pregnancy outcomes in the developing world. By reducing anaemia, deworming drugs – which can be safely administered during pregnancy – contribute directly to maternal survival.^{16,17} In anaemic women, the risk of dying during pregnancy or childbirth is up to 3.5 times higher than in non-anaemic women.¹⁸ Abundant evidence shows that regular deworming reduces anaemia in adolescent girls and women of childbearing age, thus preparing them for a healthier pregnancy.¹⁹ A large study of pregnant women in Nepal has shown that women given a deworming drug (albendazole, for treatment of soil-transmitted helminths) in the second trimester of pregnancy had a lower rate of severe anaemia during the third trimester.²⁰

Deworming also improves birth outcome. In 1989, a large study in Guatemala involving some 15 000 pregnant women found a clear link between worm infection and retarded fetal growth.²¹ In the Nepal study, birth weight of infants born to women receiving two doses of albendazole rose by 59 g. More important, infant mortality at 6 months fell by 41%.²⁰ In Sri Lanka, a study showed that deworming during pregnancy resulted in a 42% reduction in the proportions of stillbirths and perinatal deaths and a 52% reduction in low-birth-weight babies.²²

The evidence is even more compelling for schistosomiasis, which affects an estimated 10 million pregnant women in Africa alone. Recent studies show that half of these women suffer from anaemia.²³ These figures demonstrate the enormous scale of the impact that deworming can have on the survival of both pregnant women and their babies. Fortunately, praziquantel, the drug of choice for schistosomiasis, can be safely given to women at any time during their pregnancy.^{24,25}

▶ Goal 6: Combat HIV/AIDS, malaria and other diseases

While worm infections do not cause the same high mortality as that of AIDS and malaria, they do number among the “other diseases” that impair the health, physical and mental development, and productivity of huge numbers of the poor. In so doing, they anchor large populations in poverty. Reducing worm infections and other ancient companions of poverty builds the very foundation for good health and – in the spirit of the Millennium Development Goals – contributes to human progress.

Evidence that worm infections may influence the clinical burden of AIDS and malaria is just beginning to emerge. One recent study indicates that worm infections disrupt the immune response in ways that could hasten the progression from HIV infection to AIDS.²⁶ The impact of deworming on improved educational outcome also contributes to the “social vaccination” against HIV infection.²⁷ Another recent study found that malaria attacks were more frequent in persons infected with intestinal worms.²⁸ While these studies need to be confirmed, the role of deworming in building good health during a critical period of life has been amply demonstrated.

▶ Goal 8: Develop a global partnership for development

This goal includes a target, to be achieved in cooperation with pharmaceutical companies, of access to affordable, essential drugs in developing countries. For worm infections, many studies have clearly shown that morbidity can be significantly reduced through repeated and regular treatment with single-dose drugs delivered through school health programmes. The drugs are safe, inexpensive and simple to administer, and thus ideally suited for mass administration.

Because such huge numbers are affected, the benefits of bringing these drugs to the masses in need is likewise huge. Systematic delivery of deworming drugs in sustainable ways is a pro-poor strategy with great potential for development. That potential is further amplified by its suitability for integration with other mass-treatment programmes for diseases of the poor – onchocerciasis, lymphatic filariasis, blinding trachoma, and the foodborne trematode infections.²⁹ As these are diseases of the poor, they frequently overlap, thriving under the conditions of poor hygiene and sanitation seen throughout the developing world. The challenge now is to rationalize existing control programmes through integrated approaches that streamline delivery and bring down costs, thus allowing more of the world’s poor to benefit from essential drugs for ancient diseases.



Nepali girls in school



Healthy worm-free schoolchildren in Uganda

