

# DEWORMING FOR ADOLESCENT GIRLS AND WOMEN OF REPRODUCTIVE AGE

## POLICY BRIEF

Expanding the reach and coverage of deworming programmes for soil-transmitted helminthiases and schistosomiasis, leveraging opportunities and building capacities



**More than 500 million adolescent girls and women of reproductive age (including over 100 million pregnant and lactating women) are at risk of soil-transmitted helminth and schistosome infections and require treatment.**

The aim of this policy brief is to promote the regular deworming of adolescent girls and women of reproductive age. Its target audience is decision-makers, programme managers and staff of nongovernmental organizations responsible for improving the health of women. The policy brief is in the form of questions and answers, to facilitate understanding.

**Damage caused by worms**

- Hookworm, whipworm and schistosome infections cause significant blood loss.
- This blood loss is particularly harmful in women because they already lose blood during menstruation and have higher requirements for iron during and after pregnancy.
- Anaemia during pregnancy can increase the risk of low birth weight, newborn mortality and morbidity, stunting and wasting.
- Localization of schistosomiasis on the female genital tract (female genital schistosomiasis) makes women susceptible to super-infections, causes contact bleeding, and facilitates the transmission of HIV and other sexually transmitted infections (STIs).

Deworming is one of the most cost-effective, and impactful, of all public health interventions and can be safely administered to pregnant women after the first trimester.

**Current reach of deworming interventions or programmes**

- Most countries in which worm infections are endemic already organize large-scale interventions to provide deworming to preschool and school-age children.
- Few endemic countries organize interventions that include deworming girls in secondary schools. If done, the programming is often sporadic, and many adolescent girls may be missed because they do not attend school.
- Some endemic countries have a policy of including deworming during pregnancy, but this practice is not widespread; most countries do not have a stated policy, nor practice.
- Many adolescents and young women have regularly received deworming during their preschool and school years. They have therefore been protected from the morbidity caused by these parasites in that part of their life and reached adolescence with low levels of soil-transmitted helminth and schistosome infections. However, since they continue to live in the same contaminated environment, they require deworming.

**Extending the reach of deworming interventions**

- **To all adolescent girls:** by integrating with other programmes targeting this age group, such as human papillomavirus vaccination, iron and folic acid supplementation, and school health and nutrition programmes.
- **To all pregnant or lactating women** attending health clinics during antenatal care and postnatal care.

**Question 1: Which parasites are targeted by deworming programmes?**

Soil-transmitted helminths and schistosomes are two groups of intestinal or urogenital parasitic worms that infect the poorest populations of the tropics and subtropics, often those living in remote, rural areas, in urban slums or in conflict zones where sanitation is insufficient and the environment is contaminated with human excreta (1).

**Question 2: How do these parasites cause morbidity?**

The morbidity caused by these worms is proportional to the number of worms in the infected person. The more worms in the person, the higher the risk of blood loss and reduced absorption of nutrients and vitamins. Schistosome infections can also cause granulomas in the bladder, intestine and in the mucosa of the genitals (2,3).

**Question 3: Are worm infections harmful for girls and women of reproductive age and their children?**

**Yes.** In girls and women of reproductive age, blood loss exacerbates iron-deficiency anaemia and increases the risk of maternal and infant mortality and low birth weight (4). In addition, chronic and repeated schistosome infections are linked to infertility and the genital manifestations of schistosome disease (female genital schistosomiasis), which can result in vaginal bleeding, nodules in the vulva and pain during sexual intercourse (3). These ulcers, like other genital ulcers, are associated with increased risk of transmission of HIV and other STIs (5).

**Question 4: Do these infections also have a negative impact on human development?**

**Yes.** People infected with soil-transmitted helminths and schistosomes suffer diminished nutritional status which stunts growth, impairs cognitive processes, reduces school performance, lowers productivity and decreases wages in adulthood (6). Female genital schistosomiasis also contributes to social stigmatization and mental health challenges. Providing deworming treatment to adolescent girls, women of reproductive age, and children is a basic health right (7-9).

**Question 5: Is deworming safe and beneficial during pregnancy and lactation?**

**Yes, deworming after the first trimester is safe.**

WHO has analysed published and confidential unpublished reports of women receiving treatment (either albendazole or mebendazole (10) and praziquantel (11)) during pregnancy and concluded that there is no increased risk of harm to the fetus.

### Yes, deworming after the first trimester is beneficial.

Several studies have also confirmed the benefits of deworming during pregnancy (12–15). A recent study of Demographic Health Survey data reporting on more than 800 000 pregnancies in 58 countries in all regions, showed that deworming resulted in a 15% reduction in the risk of neonatal mortality and a 3–11% reduction in low birth weight (16). In 2018, the disease burden of soil-transmitted helminthiasis and schistosomiasis in women of reproductive age was estimated at approximately 2 million disability-adjusted life years lost (17).

### Question 6: Is deworming for soil-transmitted helminthiasis and schistosomiasis recommended for adolescent girls and women of reproductive age?

Yes.

WHO recommends regular deworming as a public health intervention (8, 18):

- for preschool and school-age girls, and non-pregnant adolescent girls and women of reproductive age living in areas endemic for soil-transmitted helminths and schistosomes, deworming with albendazole or mebendazole for soil-transmitted helminths and with praziquantel for schistosomes.
- for all pregnant women, after the first trimester, and for postpartum and lactating women:
  - in areas endemic for soil-transmitted helminths and where anaemia is a severe public health

problem: deworming with albendazole or mebendazole; and

- in areas endemic for schistosomes: deworming with praziquantel.

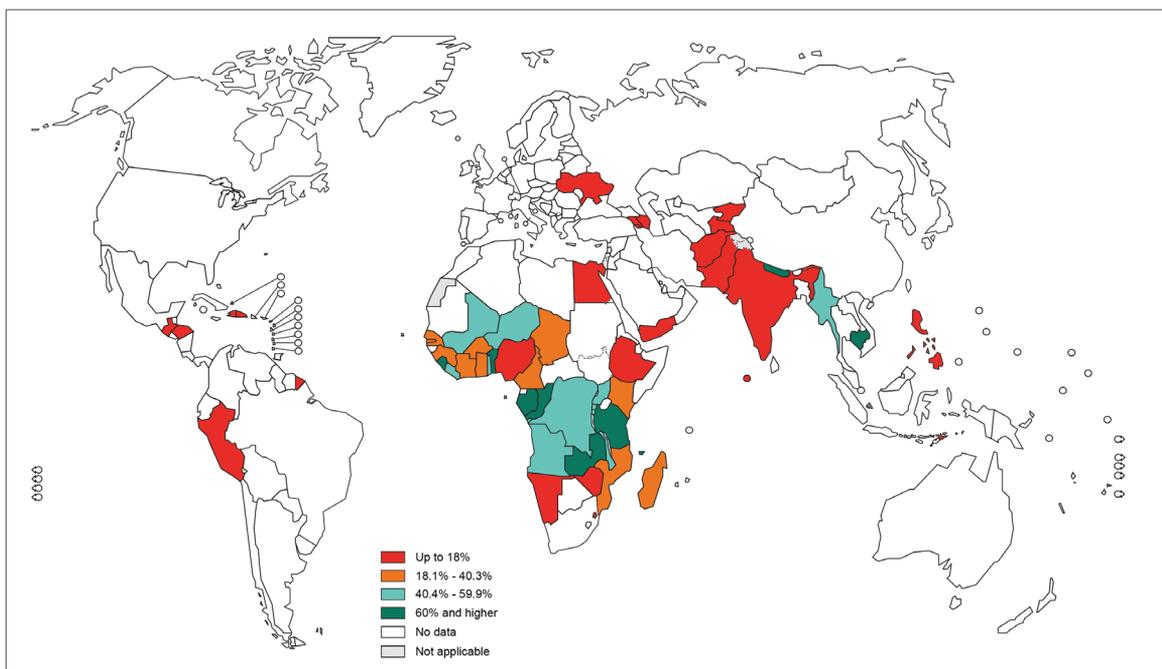
### Question 7: What is the current global coverage of deworming programmes?

Global coverage of deworming for preschool and school-age children has increased from 31% in 2010 to 60% in 2019 (19,20), and this coverage should be further increased. Currently, however, programme coverage in women of reproductive age remains low (14): an analysis of Demographic Health Survey data estimated that in 2019 only 23% of pregnant women living in areas endemic for soil-transmitted helminths and schistosomes received deworming tablets (map) (21).

### Question 8: What needs to be done to reach girls and women of reproductive age with deworming programmes?

To make the costs of distributing deworming treatment affordable, even in areas with limited resources for health, existing platforms should be maximized to reach adolescent girls and women of reproductive age, such as schools and antenatal clinics, informal training centres, adolescent-friendly clinics and services and educational institutions where the importance of deworming can be incorporated as part of health education. Country examples from Cambodia and Nepal are provided below.

Coverage of postpartum and lactating women with deworming in endemic areas (evaluated in 2019)



**Question 9: Does this intervention have a prohibitive cost?**

**No. Deworming is safe and cost-effective**

Deworming can be delivered to adolescent girls and women at a very low cost (a few cents of US\$ if using existing platforms for distribution).

Normally, health systems have detailed information on areas in which soil-transmitted helminths and schistosome infections are endemic in children. In those areas, we can assume (without conducting additional surveys) that adolescent girls and women of reproductive age should also receive deworming.

Health services provide regular antenatal services for pregnant women and postnatal services to follow the growth of the child in the first few years after birth.

The use of existing infrastructure ensures that deworming can be delivered at a very low cost:

- one deworming treatment for soil-transmitted helminthiases (1 tablet of albendazole or mebendazole) costs approximately US\$ 0.04 (22);
- one deworming treatment for schistosomiasis (on average 3 tablets of praziquantel) costs approximately US\$ 0.30 (22).

**Question 10: Where can managers of control programmes obtain technical support for implementing this intervention?**

UNESCO, UNICEF, WFP and WHO and their regional and country offices, as well as partners are available to provide technical support to endemic countries willing to establish a programme to provide regular deworming to adolescent girls and pregnant and lactating women.



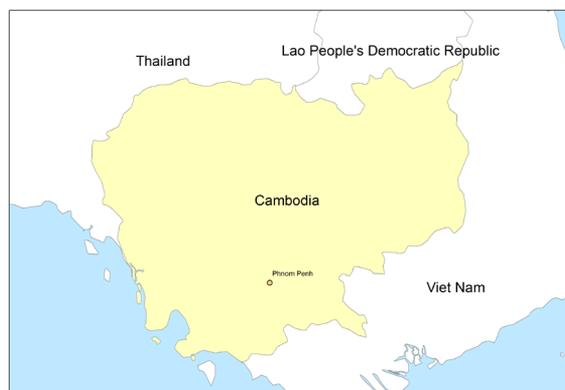
“ By providing praziquantel with HPV vaccination, we can prevent female genital schistosomiasis and further reduce the risk of risk of developing cervical cancer and HIV ”

## Country experiences

### Cambodia

Soil-transmitted helminths are endemic countrywide, whereas schistosome infections are endemic in only two provinces (Stung Treng and Kratie). Since 2005, girls and women of reproductive age have received deworming for soil-transmitted helminthiases in routine programme activities implemented through different channels depending on their age: adolescent girls receive deworming at schools (both public and private) by teachers; pregnant and lactating women, and other women, receive deworming through consultations at all public health services and outreach services offered by health centre staff. The deworming coverage of women of reproductive age has increased tremendously, reaching 72% in 2014. Cambodia is a good example of the integration of deworming activities within the health care system. Only government facilities and personnel are authorized to provide deworming treatment in Cambodia (4).

| National DHS survey year:                                  | 2004  | 2014 |
|--|-------|------|
| Deworming coverage   | 11%   | 72%  |
| Prevalence of iron deficiency anaemia among pregnant women | > 20% | 3%   |



### Nepal

Since 2001, Nepal has offered deworming (with albendazole) during pregnancy (after the first trimester) to reduce maternal anaemia in the country.

The table shows an exponential increase in deworming coverage among pregnant women between 2006 and 2016 (as reported in the respective Nepal National Demographic Health Surveys of 2006 and 2016).

A separate survey (the 2016 Nepal national micronutrient status survey) found that pregnant women who had received deworming in the 6 months before the survey had a lower prevalence of anaemia (19%) than pregnant women who had not received deworming in the previous 6 months (34%) (23).

| National DHS survey year:                                  | 2006  | 2016 |
|--|-------|------|
| Deworming coverage   | 20%   | 69%  |
| Prevalence of iron deficiency anaemia among pregnant women | > 73% | 5%   |



“WHO has long recommended that deworming treatment be offered to women of reproductive age, including pregnant women after the first trimester, in areas where the prevalence of worm infections is 20% or higher.”



## Minimum strategy to control morbidity from soil-transmitted helminths and schistosomes in adolescent girls and women of reproductive age

In areas where deworming with albendazole or mebendazole and/or praziquantel are provided to children, these medicines can also be administered to:

- adolescent girls enrolled or not enrolled in school (e.g. alongside human papillomavirus vaccination or iron and folic acid supplementation campaigns);
- pregnant women (after the first trimester) attending antenatal services;
- lactating women attending postnatal clinics; and
- women accompanying their child to vaccination services.

These interventions can be organized with minimal additional investment. They will:

- prevent the accumulation of worms;
- protect girls and women from anaemia and its consequences;
- reduce the risk of low birth weight and neonatal mortality; and
- better prepare women for a future pregnancy.

### Contacts and references

For the updated list of contacts of the partner organizations in this initiative, and the reference list, please access:

<https://www.who.int/publications/i/item/9789240037670>

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NEGLECTED  
TROPICAL DISEASES



<https://www.who.int/teams/control-of-neglected-tropical-diseases>

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## Where to get support

Support for the organization of periodical deworming of adolescent girls and women of reproductive age is available at the following email addresses:

- WHO Department of Control of Neglected Tropical Diseases: [neglected.diseases@who.int](mailto:neglected.diseases@who.int)
- WHO Maternal, Newborn, Child and Adolescent Health, and Ageing: [mncah@who.int](mailto:mncah@who.int)
- WHO Department of Sexual and Reproductive Health and Research: [srhmph@who.int](mailto:srhmph@who.int)
- WHO Collaborating Centre for Research and Training in Parasite Epidemiology and Control: [theresa.gyorkos@mcgill.ca](mailto:theresa.gyorkos@mcgill.ca)

Please consult also the following web sites:

- UNESCO, Education for Health and Wellbeing <https://en.unesco.org/themes/education-health-and-well-being>
- UNICEF Maternal Nutrition Programme Division <https://www.unicef.org/nutrition/maternal>
- UNICEF middle childhood and adolescence <https://www.unicef.org/nutrition/middle-childhood-and-adolescence>
- WFP School feeding <https://www.wfp.org/school-meals>
- WHO soil-transmitted helminthiasis control <https://www.who.int/health-topics/soil-transmitted-helminthiasis>
- WHO schistosomiasis control <https://www.who.int/health-topics/schistosomiasis>
- WHO Maternal, Newborn, Child and Adolescent Health, and Ageing <https://www.who.int/health-topics/maternal-health>
- Children Without Worms: <https://childrenwithoutworms.org/>
- TIBA (Tackling Infections to Benefit Africa): <https://tiba-partnership.org/>
- HPV Global Action <https://hpvglobalaction.org/>

## References (available online)

1. Preventive chemotherapy in human helminthiasis: coordinated use of anthelmintic drugs in control interventions: a manual for health professionals and programme managers. Geneva: World Health Organization; 2006 ([https://apps.who.int/iris/bitstream/handle/10665/43545/9241547103\\_eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/43545/9241547103_eng.pdf)).
2. Gabrielli A, Montresor A, Chitsulo L, Engels D, Savioli L. Preventive chemotherapy in human helminthiasis: theoretical and operational aspects. *Trans R Soc Trop Med Hyg.* 2011;105:683-93. doi:10.1016/j.trstmh.2011.08.013.
3. Colley DG, Bustinduy AL, Secor WE, King CH. Human schistosomiasis. *Lancet.* 2014;383(9936):2253-64. ([https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(13\)61949-2.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(13)61949-2.pdf)).
4. Reaching girls and women of reproductive age with deworming. Geneva: World Health Organization; 2018 ([https://www.who.int/intestinal\\_worms/resources/WHO-CDS-NTD-PCT-2018.01/en/](https://www.who.int/intestinal_worms/resources/WHO-CDS-NTD-PCT-2018.01/en/)).
5. Wall KM, Kilembe W, Vwalika B, Dinh C, Livingston P, Lee Y-M, et al. Schistosomiasis is associated with incident HIV transmission and death in Zambia. *PLoS Negl Trop Dis.* 2018;12(12):e0006902. doi:10.1371/journal.pntd.0006902.
6. Helminth control in school age children: a guide for managers of control programmes, 2nd edition. Geneva: World Health Organization; 2011 ([https://www.who.int/neglected\\_diseases/resources/9789241548267/en/](https://www.who.int/neglected_diseases/resources/9789241548267/en/)).
7. Global nutrition targets 2025: anaemia policy brief. Geneva: World Health Organization; 2014 ([https://www.who.int/nutrition/publications/globaltargets2025\\_policybrief\\_anaemia/en/](https://www.who.int/nutrition/publications/globaltargets2025_policybrief_anaemia/en/)).
8. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization; 2016 (<https://www.who.int/publications/i/item/9789241549912>).
9. Gyorkos TW, Montresor A, Belizario V, Biggs B-A, Bradley M, Brooker SJ, et al. The right to deworming: the case for girls and women of reproductive age. *PLoS Negl Trop Dis.* 2018; 22;11:e0006740 ([https://edoc.unibas.ch/67078/1/20181205122223\\_5c07b4ef67385.pdf](https://edoc.unibas.ch/67078/1/20181205122223_5c07b4ef67385.pdf)).
10. de Silva NR, Sirisena JLGJ, Gunasekera DPS, Ismail MM, de Silva HJ. Effect of mebendazole therapy during pregnancy and birth outcome. *Lancet.* 1999; 353:145-9 ([https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(98\)06308-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(98)06308-9/fulltext)).
11. Report of the WHO informal consultation on the use of praziquantel during pregnancy/lactation and albendazole/mebendazole in children under 24 months. Geneva: World Health Organization; 2002 (<https://apps.who.int/iris/handle/10665/68041>).
12. Torlesse H, Hodges M. Anthelmintic treatment and haemoglobin concentrations during pregnancy. *Lancet.* 2000; 356:1083 (<https://pdf.sciencedirectassets.com/271074/1-s2.0-S0140673600X02097/1-s2.0-S0140673600027380/main.pdf>).
13. Christian P, Khatry SK, West KP Jr. Antenatal anthelmintic treatment, birth weight, and infant survival in rural Nepal. *Lancet.* 2004; 364:981-3. doi:10.1016/S0140-6736(04)17023-2.
14. Casey GJ, Sartori D, Horton SE, Phuc TQ, Phu LB, Thach DT, et al. Weekly iron-folic acid supplementation with regular deworming is cost-effective in preventing anaemia in women of reproductive age in Vietnam. *PLoS One.* 2011; 6:e23723. doi:10.1371/journal.pone.0023723.
15. Gyorkos TW, St-Denis K. Systematic review of exposure to albendazole or mebendazole during pregnancy and effects on maternal and child outcomes, with particular reference to exposure in the first trimester. *Intern J Parasitol.* 2019; 49:541-54. doi:10.1016/j.ijpara.2019.02.005.
16. Walia B, Kmush B, Lane SD, Endy T, Montresor A, Larsen DA. Routine deworming during antenatal care decreases risk of neonatal mortality and low birthweight: a retrospective cohort of survey data. *PLoS Negl Trop Dis.* 2021 [in press].
17. Disease burden and mortality estimates: cause-specific mortality, 2000–2016. In: *Health Statistics and information systems [website]*. Geneva: World Health Organization; 2018 ([https://www.who.int/healthinfo/global\\_burden\\_disease/estimates/en/](https://www.who.int/healthinfo/global_burden_disease/estimates/en/)).
18. Guideline: preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups. Geneva: World Health Organization; 2017 (<https://www.who.int/nutrition/publications/guidelines/deworming/en/>).
19. Soil-transmitted helminthiasis: number of children treated in 2010. *Wkly Epidemiol Rec.* 2012; 87(23):225–32 (<https://www.who.int/wer/2012/wer8723.pdf>).
20. Montresor A, Mupfasoni D, Mikhailov A, Mwinzi P, Lucianez A, Jamsheed M, et al. The global progress of soil-transmitted helminthiasis control in 2020 and World Health Organization targets for 2030. *PLoS Negl Trop Dis.* 2020; 14(8):e0008505 (<https://pubmed.ncbi.nlm.nih.gov/32776942/>).
21. Bangert M, Bancalari P, Mupfasoni D, Mikhailov A, Gabrielli A, Montresor A. Provision of deworming intervention to pregnant women by antenatal services in countries endemic for soil-transmitted helminthiasis. *PLoS Negl Trop Dis.* 2019; 13(5):e0007406 (<https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0007406>).
22. UNICEF supply catalogue: <https://supply.unicef.org/all-materials/pharmaceuticals.html>
23. Nepal national micronutrient status survey, 2016. Kathmandu: Ministry of Health and Population; 2018 (<https://www.unicef.org/nepal/reports/nepal-national-micronutrient-status-survey-report-2016>).