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Albendazole and Mectizan® (ivermectin),
distributed yearly as part of the Global Programme
to Eliminate LF, also provide effective widespread
control of intestinal parasite infections at no
additional cost to individuals or health care systems.



Global Program to Eliminate Lymphatic Filariasis

Extending the Benefits

Improving the Health of Women and Infants

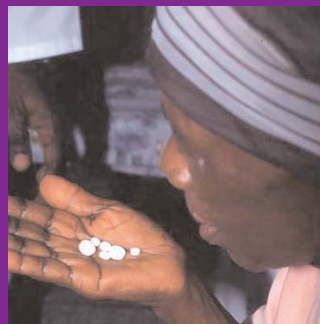
by Treating Intestinal Parasites



Providing the technical expertise to ensure a strong scientific base for the Global Programme to Eliminate Lymphatic Filariasis

Lymphatic Filariasis

Intestinal Parasite Infections



Two Debilitating Conditions Sharing a Common Solution

Albendazole and ivermectin are two mainstay drugs essential for success in the Global Programme to Eliminate Lymphatic Filariasis (LF), and both are donated* specifically to achieve this goal for the one billion individuals currently at risk.

But the benefits of the Global Programme extend beyond LF.

Albendazole is also a mainstay drug for treating intestinal parasites, while ivermectin has broad anti-parasite effects as well.

So, for women of childbearing age, their infants and children – too often society's most vulnerable populations – the Global Programme to Eliminate LF provides not only freedom from LF but also all the benefits of improved health that come from treating debilitating intestinal parasite infections, and all at no additional cost either to families or to national healthcare systems.

* Albendazole by GlaxoSmithKline and Mectizan® (ivermectin) by Merck & Co., Inc.

Mectizan® (ivermectin) has formal regulatory approval for use in lymphatic filariasis and onchocerciasis.



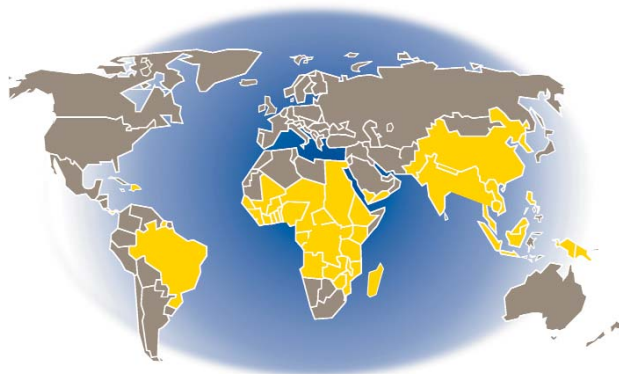
LYMPHATIC FILARIASIS AND INTESTINAL PARASITE INFECTIONS

What Do They Have in Common?

redrawn from WHO 02.47



■ Areas where Intestinal Parasites
are a public health problem



■ Lymphatic Filariasis endemic countries

Lymphatic filariasis (LF) and intestinal parasites, among the most widespread and chronically debilitating infections in developing countries, put the health of millions of women and their families in jeopardy.

Both being diseases of poverty, intestinal parasite infections are equally common as lymphatic filariasis in most areas where LF is endemic.

But fortunately, LF and intestinal parasite infections share more in common than just geographic distribution. Amazingly, the same drugs used to control LF, are among the best drugs available to treat and prevent intestinal parasite infections. The geographic overlap of these infections ensures that many communities in need of treatment for intestinal parasites will, in fact, now receive it as an additional benefit of the Global Program to Eliminate LF.





AN UNFAIR BURDEN

All around the world women of childbearing age must work as mothers, income earners, family caretakers, and more. But for women in developing countries where intestinal and other parasite infections abound, this workload is even more burdensome because poor health conditions coupled with poverty create additional and seemingly insurmountable challenges of:



Poor Maternal Health

- Anemia, especially in pregnancy, and particularly where hookworm is endemic¹
- Malnutrition associated with repeated and often closely-spaced pregnancies followed by long periods of lactation²
- Poor appetite and consequent inadequate nutrient intake associated with hookworm, roundworm and whipworm infections²

Harsh Economic Situation

- Heavy demands of physical labor, childcare and household chores even when pregnant or ill²
- Low incomes for mothers and inadequate access to health care for themselves and their children²
- Decreased productivity associated with intestinal parasite burdens³

Unhealthy and Poorly Educable Children

- Low birth-weight of newborns caused by inadequate maternal-weight gain during pregnancy⁴
- Low birth-weight, stunting and anemia in childhood – all increasing the probability of late school enrollment, higher absenteeism, lower school achievement, and higher school dropout rates.⁴



Many of the debilitating health problems associated with intestinal parasites, especially anemia and malnutrition, can be mitigated with a simple course of medicine. The challenge has been to make effective treatment routinely accessible to the individuals and communities most in need.

The Global Programme to Eliminate Lymphatic Filariasis actively addresses this challenge, since the benefits of its LF drug distribution activities support the goals of intestinal parasite control programs as well.⁵



WITHOUT ADEQUATE TREATMENT

The situation for women with untreated intestinal parasites in developing countries is grim.

The three most common soil-transmitted intestinal parasite infections — hookworm, roundworm (*Ascaris lumbricoides*) and whipworm (*Trichuris trichiura*) — constitute an insidious but enormous health burden throughout the tropics, especially in women, children and infants. Hookworm is a principal cause of anemia in hookworm endemic areas⁷ and even relatively light hookworm infections can decrease growth and inhibit weight gain in pregnancy.²

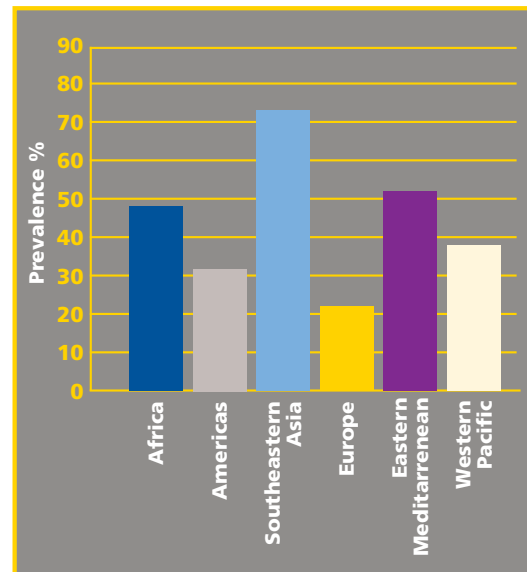
Without access to appropriate treatment, women with intestinal parasites face severe health consequences, particularly during and after pregnancy:

- Anemia causes headache, palpitations and weakness that decrease productivity by lowering physical capacity and that diminish education potential by interfering with cognitive performance.¹
- Iron deficiency anemia decreases appetite and leads to poor weight gain in pregnancy and stunted growth in children.²
- The incidence of premature deliveries in severely anemic women can be three times the rate for women with normal iron levels.¹

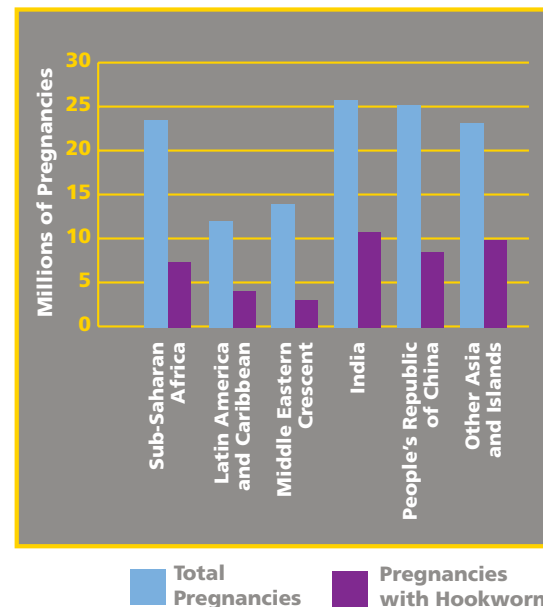
Despite the World Health Organization’s strong recommendation for “guaranteed access of women and children to anti-helminth treatment via the health services,”⁹ overburdened and under-financed national health services often cannot provide treatment to even the highest-risk groups – women of childbearing age and children.¹⁰ Anemia and iron deficiency are more common in pregnancy than in any other population group.⁸

An estimated 56% of pregnant women in developing countries (more than 75% in some areas) are anemic – even more suffer from iron deficiency.⁸

Anemia in pregnant women throughout the world⁸



Number of pregnancies complicated by hookworm infections worldwide⁷







IMPROVING THE HEALTH OF WOMEN: TREATING LF AND INTESTINAL PARASITES

Albendazole and Ivermectin

BROAD ANTI-PARASITE EFFECTIVENESS OF SINGLE-DOSE ALBENDAZOLE OR IVERMECTIN WHEN USED ALONE

PARASITE/INFECTION	ALBENDAZOLE* 400mg ^d	IVERMECTIN* 200 mcg/kg
Hookworm	95%	0-20%
Roundworm <i>Ascaris lumbricoides</i>	100%	100%
Whipworm <i>Trichuris trichiura</i>	40-60%	10-50%
Strongyloides <i>stercoralis</i>	45%	95%
Cutaneous larva migrans	80%	100%
River Blindness <i>Onchocerca volvulus</i>	—	95% ^b
Lice	—	100%
Scabies	—	100%

^aAlso effective against other parasite infections (*Cysticercosis*, *Echinococcosis*, *Giardia*, *Trichomonads*, *Microsporidia*, and *Cryptosporidia*) but requiring multiple doses.

^bKilling effect against microfilariae only.

*While both drugs remain contraindicated by their manufacturers for use during pregnancy, particularly the first trimester, there is no evidence from extensive use of these drugs to suggest that inadvertent or elective therapy during pregnancy constitutes a risk.⁶

The same drugs already used in the Global Programme to Eliminate Lymphatic Filariasis (LF) effectively prevent the ravages of intestinal parasite infections as well.

The 2-drug once-yearly regimen administered as the mainstay of national LF elimination programs is the combination of albendazole plus either Mectizan® (ivermectin) or DEC (diethylcarbamazine).¹¹ Albendazole is the most effective drug available today for broad anti-parasite treatment of hookworm, roundworm, and whipworm, while ivermectin is also effective against lice, scabies, strongyloides and other parasites.^{12,13}

So, treating lymphatic filariasis means that hookworm infection and the anemia it causes can, at the same time, be dramatically reduced!⁷

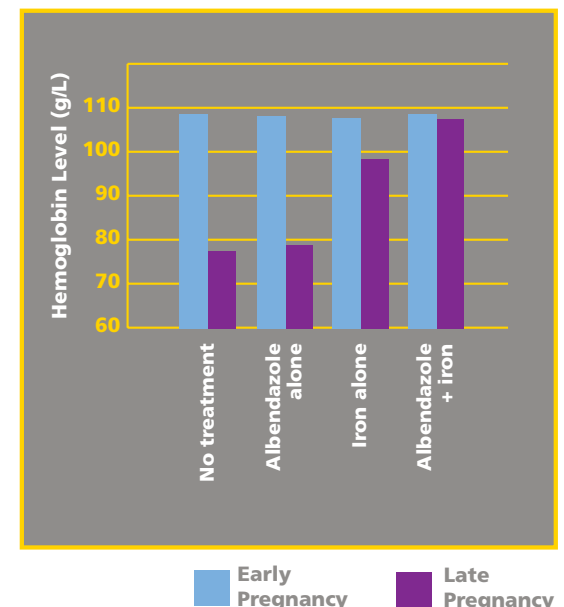
Every year 100,000 women die during childbirth because of iron deficiency,¹⁴ but a single dose of anti-parasite medication after the first trimester of pregnancy, particularly when supplemented with daily iron and folate, effectively improves iron status in pregnant women.¹⁵

Because it can be done so easily, treating women of childbearing age for the most common and debilitating intestinal parasites – hookworm, roundworm and whipworm – is imperative. Indeed, WHO recommends that anti-parasite treatment be included in all strategies to improve maternal nutrition in every area where hookworm is endemic and anemia is prevalent.⁷

Now through the activities of national LF elimination programs, it is possible to provide the needed treatment to millions of women on a regular basis.

Albendazole (and in Africa Mectizan® [ivermectin]) is already available to women as part of the Global Programme to Eliminate Lymphatic Filariasis. The additional benefits gained from treating intestinal parasites come at no additional cost for health care systems or individuals, because of the generosity of the drug manufacturers, GlaxoSmithKline (albendazole) and Merck & Co., Inc., (Mectizan® [ivermectin]) who donate the drugs specifically for the elimination of LF.

Albendazole and Iron protect hemoglobin levels (prevent anemia) in pregnant women¹⁵



n=29-35 per group



NEW OPPORTUNITIES FOR TREATMENT

Immediate Benefits



Albendazole, now widely available to women in LF endemic areas through the Global Program to Eliminate Lymphatic Filariasis, offers special benefits to women.

Women who take albendazole, or albendazole plus Mectizan® (ivermectin), greatly improve their own health and economic status, as well as the health and development of their children through:

Improved Maternal Health

- Better nutrition and overall health for mothers, during and after pregnancy.⁷
- Lower mortality from severe anemia, especially in childbirth.⁷
- Lower maternal hospitalization rates for severe anemia and hemorrhage.⁷

Economic Benefits

- Less time and money lost due to poor health of mothers and children.²
- Greater ability of mothers to care for children and families.²
- Better work and earning capacity for mothers.¹⁶

Healthier and Brighter Children

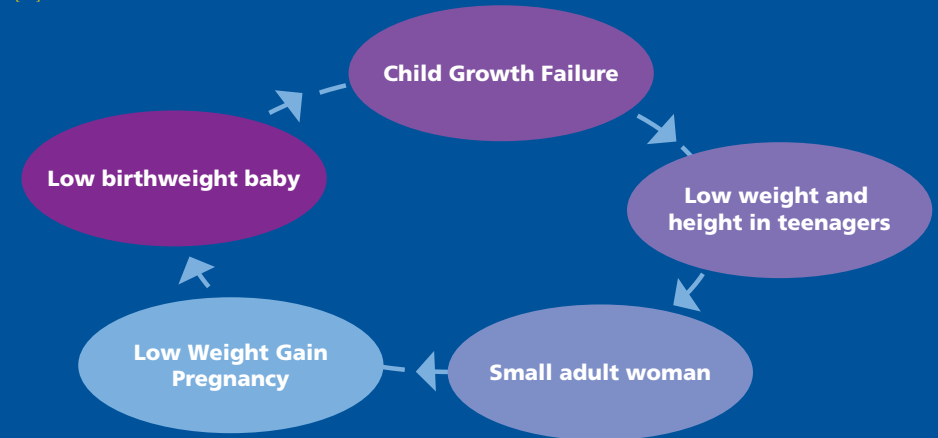
- Lower incidence of low birth weight babies and neonatal death.⁷
- Better growth and health of infants, continuing into adulthood.²
- Increased educability and social capacity of children.⁴

HOPE FOR FUTURE GENERATIONS

Long-term Benefits

The Perpetuation of Growth Failure

Adapted from ref [12]



This vicious cycle can be broken. Effective treatment of intestinal parasites with the same drugs used to treat LF provides important benefits to communities today and in the future.

The immediate benefits of treating intestinal parasites are striking and bring real improvements to the lives of tens of millions of women. Just as remarkable, moreover, are the long-term benefits of health and productivity in *future* generations that come from treating women today.

The principal reason is the link between hookworm infection and both maternal anemia and stunted growth in children – whose own offspring will also then be at-risk for low-birth-weight and stunting.

The cycle continues generation after generation.

Not only are there health risks from stunting and low-birth-weight, there are developmental consequences as well. Stunted, low-birth-weight children are more likely to be delayed in their enrollment in primary school, be absent from school more often, exhibit lower cognitive test scores, repeat grades, and drop-out of school earlier and more often than non-stunted children.^{4,17}

Treatment of their intestinal parasites can break this cycle and give these children a healthier start in life.



LINKING PROGRAMS TO ELIMINATE LF WITH PROGRAMS TO CONTROL INTESTINAL PARASITES

A Public Health Imperative

The distribution of albendazole by the Global Programme to Eliminate LF offers an unprecedented level of support to programs focused on the control of intestinal parasites.⁵ It does not, however, substitute for *all* of the necessary control activities of these programs; for example,

- In heavily endemic areas, once-yearly treatment as employed for LF elimination, may not be sufficient to control or prevent the morbidity due to intestinal parasites in women and children.¹³ Rather, the once-yearly treatment may need to be supplemented with additional doses of medicine at six-month intervals, administered by the health care system, schools or other effective mechanisms.¹⁸
- Furthermore, control of intestinal parasites in the developing world relies not just on delivery of appropriate medication. It also requires dedicated and culturally appropriate long-term health education, accompanied by improvements in both community sanitation and water supplies.

Even following treatment of intestinal parasites, re-infection may occur within a few months for many persons in highly endemic areas. However, each round of treatment offers repeated cures for some and,

more importantly, substantial reductions in the worm burdens of all of these infections. This is particularly important since it is well-documented that it is not so much the cure of individuals, as it is the lowering of worm burdens that leads to significant nutritional and health benefits for all those receiving treatment!

Implementation of the Global Programme to Eliminate LF already addresses *one* of the essential elements of Intestinal Parasite Control by providing the anti-parasite drug treatment, and it does so at essentially no additional cost to the health system or individual. Effective coordination between national intestinal parasite control programs and national programs to eliminate LF can, must and will result in cost-effective public health solutions, both for the people suffering from these diseases of poverty and disability and for their communities whose development will accelerate when good health is restored.



GLOBAL PROGRAMME TO ELIMINATE LF

Lymphatic filariasis has been recognized for more than 4,000 years. Over 120 million people are infected, with 20 million of them incapacitated or disfigured. More than a billion are at risk of the disease. Spread by mosquitoes, tiny LF worms live in the body's lymphatic vessels and over the years can cause devastating disease, such as grotesquely swollen limbs and genitals ("elephantiasis") and debilitating fevers and pain. The disease is usually contracted in childhood, often before the age of five. Outward signs may not appear for a number of years, or at all, but even those showing no external signs of infection suffer internal damage to the lymph system, kidneys and host-defenses.

The principal strategy of the Global Programme to Eliminate LF is to stop transmission of this infection by treating the entire 'at risk' population once a year with a single co-administration of two drugs for four to six years. The two alternative regimens used are: single doses of albendazole (400mg) plus ivermectin

(150-200 mcg/kg/body wt) or single doses of albendazole (400mg) plus DEC (diethylcarbamazine, 6mcg/kg/body wt)¹¹. Through the generosity of GlaxoSmithKline and Merck & Co., Inc., albendazole and Mectizan® (ivermectin) are donated free of charge; DEC is a widely-used and very inexpensive medicine.

Because LF threatens one fifth of the world's population and causes enormous disability, in 2000, the Global Programme to Eliminate Lymphatic Filariasis was launched as a Partnership (Global Alliance) of public, private and international institutions with the goal to eliminate this disease as a public health problem throughout the world, principally by

- breaking the cycle of LF transmission through annual treatment of at-risk communities with two safe and effective drugs, donated by Alliance partners; and
- alleviating the disability and suffering of those already afflicted with LF through simple hygiene measures and, in some cases, surgery.

This two-pronged approach – to prevent the disease and to reduce disability – distinguishes LF from other disease eradication programs which focus almost entirely on prevention. Another distinctive feature of the LF program is the dramatic impact it has on treating intestinal parasites. The additional benefits of this treatment include improved overall nutrition and growth, especially among children, and the ability to integrate LF treatment activities with those of other health programs – thereby yielding greater cost efficiency and stronger health systems.





Credits

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THE EVIDENCE

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