

Global Program to Eliminate Lymphatic Filariasis

Extending the Benefits

Preventing and Treating Intestinal Parasites in Children



EMORY
ROLLINS
SCHOOL OF
PUBLIC
HEALTH

LYMPHATIC FILARIASIS SUPPORT CENTER

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



- 1.0 additional kilogram of weight gain in four months ²
 - 0.6 additional centimeter growth in height in only four months ²
 - enhanced eye-hand coordination, learning ability and concentration ⁴
 - 20% improvement on cognitive tests ⁵
 - improved school attendance in stunted children ¹⁰
 - significant improvements in fitness scores ²
 - 43% increase in spontaneous play ¹
 - increased appetite ¹
- and more...

What can produce these results in children infected with intestinal parasites?

Albendazole or ivermectin given with albendazole.

How much does it cost?

Nothing.

Why?

Albendazole and ivermectin are already available to these children as part of the Global Programme to Eliminate Lymphatic Filariasis.*

The additional benefits gained from treating their intestinal parasites come at no additional cost for health care systems or individuals, because, through the generosity of GlaxoSmithKline and Merck & Co., Inc., both albendazole and ivermectin (Mectizan®) are donated free of charge to the Global Programme to Eliminate Lymphatic Filariasis.

* see page 15

CONTROLLING INTESTINAL PARASITES WHILE ELIMINATING LYMPHATIC FILARIASIS

Worldwide, hundreds of millions of people are infected with intestinal parasites. Children are at particular risk of infection and the long-term damage inflicted by these parasites. In some areas, more than 90% of children have hookworm, whipworm, or roundworm infections. Stunting, anemia, vitamin A deficiency and malnutrition are the most visible clinical consequences, all direct causes of severely delayed growth and development.

Amazingly, once-yearly doses of the same drugs already used in the Global Programme to Eliminate

Lymphatic Filariasis (LF) can prevent the ravages of intestinal parasite infections as well.

In all settings, albendazole and ivermectin are the drugs of choice for broad anti-parasitic treatment of hookworm, roundworm, whipworm, lice, scabies and other parasitic infections.

Distributed yearly as part of the global LF elimination program, albendazole and ivermectin now provide effective widespread control of intestinal parasite and other infections to affected populations, and at no additional cost to individuals or health care systems.

INTESTINAL PARASITES – PREVALENCE AND WORLDWIDE DISTRIBUTION

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 children.

Estimates show that among preschool children in endemic regions:

- nearly 1/3 (160 million) harbor roundworm infections
- 1/5 (115 million) have whipworm infections
- 7% (>40 million) are infected with hookworm

In addition, among school-age children:

- 1/3 (320 million) have roundworm infections
- 1/4 (240 million) are infected with whipworm
- 1/4 (240 million) harbor hookworm infections

In some areas more than 90% of children are infected with one or more of these parasites!

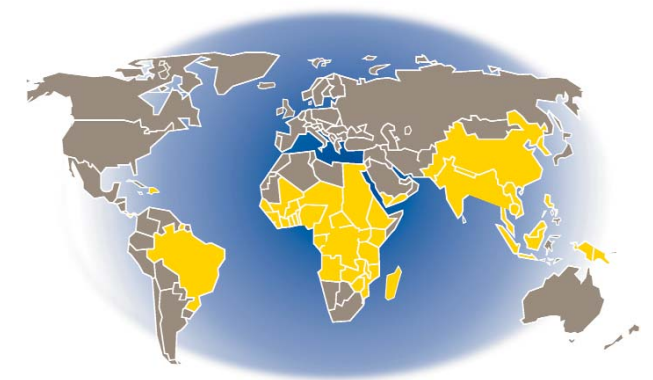
Soil-transmitted intestinal parasites are equally common as lymphatic filariasis in most areas where LF is endemic. Furthermore, the geographic overlap of these infections ensures that the people most in need of anti-parasitic treatment for their intestinal parasites will receive it as an additional benefit of the Global Programme to Eliminate LF.



redrawn from WHO 02.47



■ Areas where Intestinal Parasites are a public health problem



■ Lymphatic Filariasis endemic countries







MALNUTRITION AND ANEMIA – The Most Severe Consequences of Intestinal Parasite Infections

Intestinal parasite infections not only are common but they are chronic and have very serious health consequences. Most importantly they exacerbate all types of malnutrition found in LF-endemic areas, whether protein-energy malnutrition, iron deficiency and anemia, or vitamin A deficiency.

Without treatment these intestinal parasite infections erode the general health of populations and cause impaired physical and cognitive development in children.

Most severe and widespread of the nutritional problems aggravated by intestinal parasite infections are protein-energy malnutrition and iron deficiency anemia - over 60% of children in some areas are anemic. Treatment *is* available for hookworm, roundworm and whipworm infections and can alleviate these health risks.

THE EXTENT OF MALNUTRITION IN DEVELOPING COUNTRIES, 1995-2000		
Underweight children	27% of 0 to 5 year olds	150 million
Stunted children	32% of 0 to 5 year olds	182 million
Wasted children	9% of 0 to 5 year olds	51 million
Iron deficiency		3580 million (all ages)
Anemia	42% of 0 to 5 year olds 53% of 5 to 14 year olds 56% of pregnancies	2000 million (all ages)
Vitamin A deficiency	42% of 0 to 5 year olds (globally)	251 million
Iodine Deficiency Diseases & Goiter	15 % (all ages)	834 million

Adapted from ref 6; Data sources: refs 7, 8

ALBENDAZOLE AND IVERMECTIN – The Best Drugs to Control Intestinal Parasites Are the Same Drugs Used to Eliminate LF

Either albendazole plus ivermectin or albendazole plus DEC is the drug regimen administered once yearly as the mainstay of the national programs to eliminate LF.

Albendazole and ivermectin are also the most effective drugs available for broad anti-parasite treatment of hookworm, roundworm, whipworm, lice, scabies and other parasitic infections.

BROAD ANTI-PARASITE EFFECTIVENESS OF SINGLE-DOSE ALBENDAZOLE OR IVERMECTIN WHEN USED ALONE		
PARASITE/INFECTION	ALBENDAZOLE 400mg ^a	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%

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

^b Killing effect against microfilariae only.





WHAT BENEFITS CAN BE DOCUMENTED AFTER TREATING INTESTINAL PARASITE INFECTIONS?



Recent studies identify the very real gains that can be made from treating children with intestinal parasites in LF-endemic communities:

Growth and development –

5 months after being treated with albendazole and ivermectin, children gained over 0.5 kg more than children treated with placebo (Haiti).⁹

Physical fitness –

7 weeks after being treated with albendazole for intestinal worms, school children had improved resting heart rates and increased physical fitness as assessed by the Harvard step test (Kenya).¹⁴

Physical activity –

9 weeks after treatment with albendazole, school children showed demonstrable increases in spontaneous play and other measurable activities (Kenya).¹

School attendance –

6 months after treatment with albendazole, stunted children with whipworm infection showed improved school attendance (Jamaica).¹⁰

Cognitive performance –

5 months after treatment with mebendazole (a benzimidazole anthelmintic like albendazole) for roundworm infections, school children demonstrated improved learning ability, concentration and eye-hand co-ordination (Indonesia).⁴

Improved Growth and Development

Intestinal parasite infections take a severe toll on the nutritional status of infected children, resulting in poor growth, anemia and an inability to absorb vital nutrients. Albendazole and ivermectin can make measurable differences in the physical development of a child.

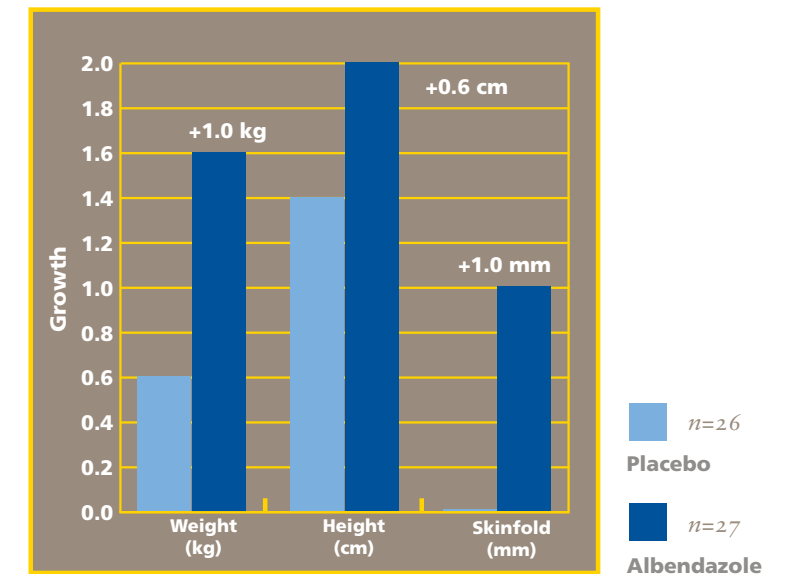
- Nutrient absorption (protein, fat, vitamin A, iodine, lactose, d-xylose) increased after treatment for roundworm.⁴

- Appetite and weight gain improved in undernourished primary school children after single-dose treatment for hookworm, roundworm and whipworm in Kenya and Indonesia.^{3,4}

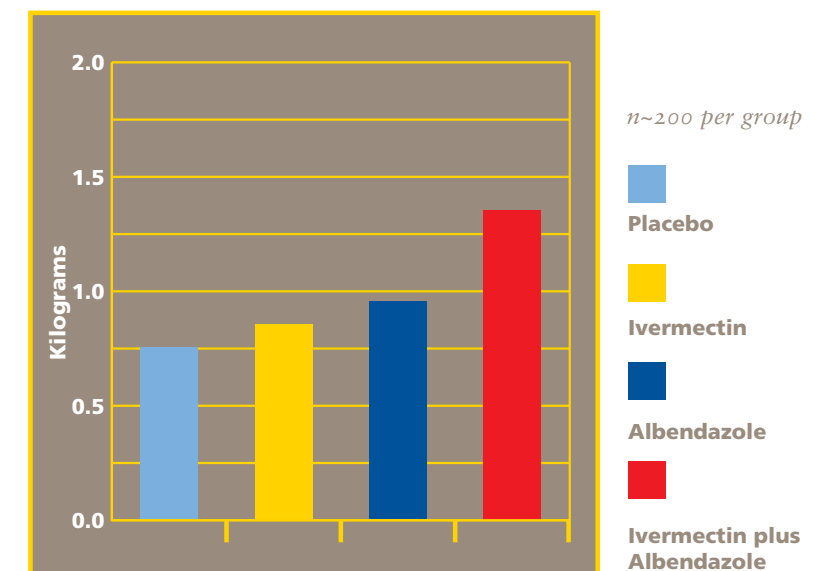
- Growth rates improved in treated preschool and primary school children infected with hookworm, roundworm and whipworm – findings from Kenya, Tanzania, India, Indonesia, Myanmar, Haiti and elsewhere.^{4,10}

- Benefits of treatment for hookworm or whipworm with anthelmintics and iron supplements also include improved hemoglobin levels, iron status and growth rates.¹⁰⁻¹²

Growth 4 Months After Treatment²

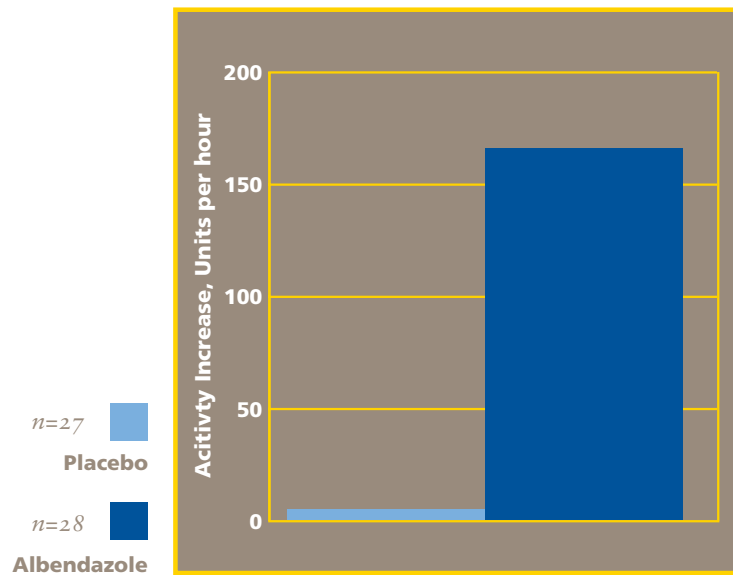


Weight Gain at 5 Months After Treatment⁹



Increased Physical Fitness and Activity

Increase in Physical Activity in Kenyan School Children 9 Weeks after Treatment for Intestinal Parasites¹

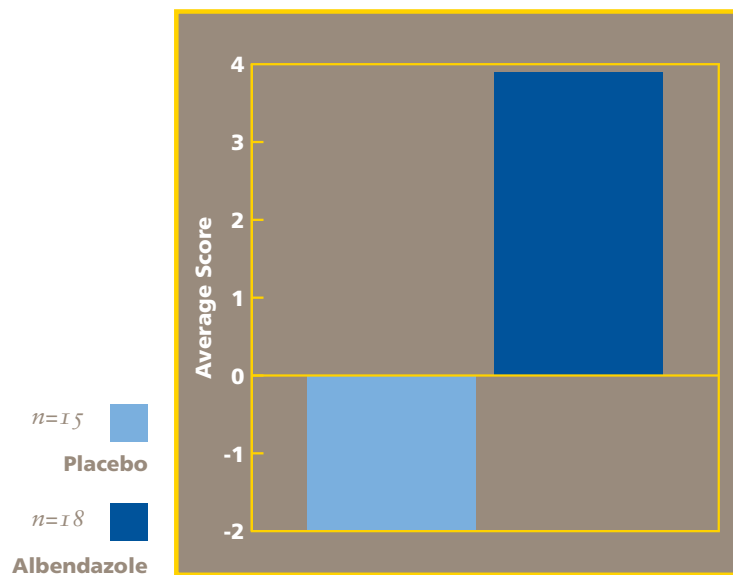


Children infected with intestinal worms and malnutrition are often lethargic and lack physical stamina. Within weeks of treatment, children enjoy significant increases in physical activity and spontaneous play.

- Resting heart rates and physical fitness on the Harvard step test improved, along with more rapid growth in children from Kenya and Indonesia after they were treated for intestinal worms.^{2, 4, 11}

- Physical activity increased in young school children as seen in measurements of spontaneous play behavior in Kenya and Indonesia after treatment.¹

Change in Harvard Step Test Score 7 Weeks after Treatment¹⁴



Gains in Cognition and Education

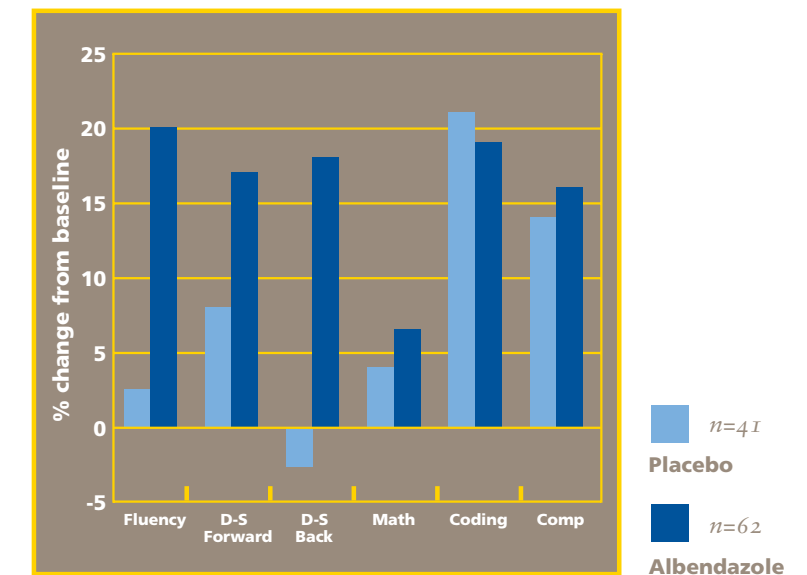
The benefits of treatment are not limited to *physical* improvements. Significant gains have been measured in school attendance, test scores and the ability to learn.

- Improved school attendance has been documented in stunted children treated for whipworm infection (Jamaica).¹⁰

- Higher spelling scores were recorded in school children treated for heavy whipworm infections (Jamaica).¹⁰

- Improved learning ability, concentration and eye-hand coordination followed treatment of school children for roundworm infection (Indonesia).⁴

Cognitive Tests: Albendazole vs. Placebo redrawn from ref 5



BENEFITS FROM USING ALBENDAZOLE AND IVERMECTIN TO ELIMINATE LF ARE MULTIPLIED FOR MILLIONS OF CHILDREN ALSO SUFFERING FROM INTESTINAL PARASITES

The immediate impact of albendazole and ivermectin on intestinal parasite infections, especially in children, offers long-term gains in health and development for treated communities.

These benefits come at no additional cost to the health system or individual since albendazole and ivermectin are distributed as mainstay drugs of the LF elimination program. Annually, more than 200 million children will be treated for intestinal parasites *through national LF Elimination programs*.



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

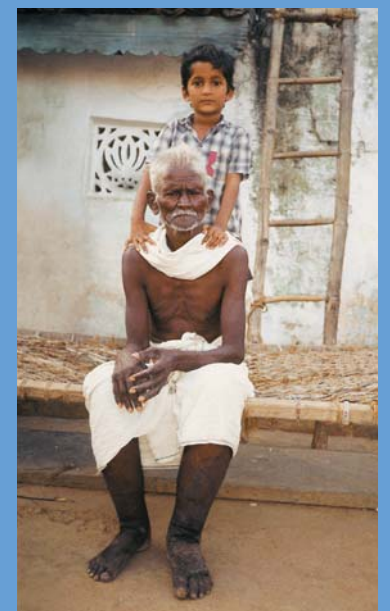
(150-200 mcg/kg/body wt) or single doses of albendazole (400mg) plus DEC (diethylcarbamazine, 6mcg/kg/body wt)¹³. Through the generosity of GlaxoSmithKline and Merck & Co., Inc., albendazole and ivermectin (Mectizan®) are donated free of charge; DEC is a widely-used and very inexpensive medicine.

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

Compiled by:

L.S. Stephenson, International Nutrition Program,
Division of Nutritional Sciences, Cornell University,
Ithaca, NY, USA

E.A. Ottesen, Lymphatic Filariasis Support Center,
Department of International Health, Emory University,
Atlanta, GA, USA

In collaboration with F. Rio (WHO), L. Savioli (WHO),
A. Montessor (WHO), and V. Guisinger (Emory LFSC)

Photos by:

Bobbie Person

Photo on page 10 courtesy of GlaxoSmithKline

Photos on Outside Back Cover courtesy of WHO/TDR/Crumphorn

THE EVIDENCE

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Emory LF Support Center
Department of International Health
Rollins School of Public Health
1518 Clifton Road, NE
Atlanta, GA 30322
USA

web site: www.filariaasis.us
e-mail: LFSC@sph.emory.edu
phone: (1) 404-727-5621
fax: (1) 404-727-5530



Albendazole and 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.

